

EE-Sim User Manual

September 2015



maxim
integrated™

©2015 Maxim Integrated, Inc. All Rights Reserved.

No part of this documentation may be reproduced nor distributed in any form or by any means, graphic, electronic, or mechanical, including but not limited to photocopying, scanning, recording, taping, e-mailing, or storing in information storage and retrieval systems without the written permission of Maxim Integrated (hereafter, Maxim). Products that are referenced in this document such as Microsoft Windows® may be trademarks and/or registered trademarks of their respective owners. Maxim makes no claim to these trademarks. While every precaution has been taken in the preparation of this document, individually, as a series, in whole, or in part, Maxim, the publisher, and the author assume no responsibility for errors or omissions, including any damages resulting from the express or implied application of information contained in this document or from the use of products, services, or programs that may accompany it. In no event shall Maxim, publishers, authors, or editors of this guide be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

September 2015 Online Edition

CONTENTS

1	Getting Started.....	5
1.1	Introduction	5
1.2	Basic User Prerequisites.....	5
1.3	Conventions Used in This Manual	6
1.4	Register as a New User	7
1.5	Start Using EE-Sim.....	7
1.5.1	Start EE-Sim as a New User	7
1.5.2	Start EE-Sim as the Recipient of a Shared Design	8
1.5.3	Open an Existing Design.....	8
1.5.4	Save Changes to Your Own Design	9
1.5.5	Save Changes to a Shared Design.....	9
1.5.6	Close EE-Sim	10
1.6	Web Browsers Support Easy Automatic Logins.....	10
2	Designs, Contacts, and Sharing	11
2.1	My Designs	11
2.1.1	Create a New Contact.....	12
2.1.2	Manage Your Contacts.....	12
2.1.3	Share a Single Design	13
2.1.4	Share Multiple Designs.....	14
2.2	Use Reference Designs from Maxim.....	14
3	DC-DC Converter Designs V2 (Beta).....	15
3.1	Open an Existing Design.....	15
3.2	Create a New Design	16
3.3	Specify Input, Output, and Other Design Requirements	17
3.4	Create a Schematic and Save Your Design.....	18
3.5	Next Steps	18
3.6	Edit a Schematic.....	19
3.6.1	Edit Component Properties	19
3.6.2	Select a New Vendor Part.....	21
3.6.3	Annotate a Schematic Using the Toolbar	23
3.6.4	Schematic Toolbar Reference Chart	25
3.6.5	Version History	29
3.7	Export a Component or Schematic as PNG or SVG	30
3.8	Simulation and Analysis.....	31
3.8.1	Run a Simulation and Generate Waveforms	31
3.8.2	View Simulation Waveforms.....	33
3.8.3	Customize the Waveform Viewer Output.....	34
3.9	Compare Design Iterations.....	40
3.10	Generate a Design Report and BOM (DC-DC)	42
3.10.1	Publish a Design Report and BOM	42
3.10.2	Download the BOM, Report, and Schematic.....	43
4	DC-DC Conversion Designs V1	44
4.1	Creating a New Design.....	44
4.2	Specifying Input, Output, and Other Design Requirements	45

4.3	Generating a Schematic and Saving Your Design	45
4.4	Next Steps	46
4.5	Modifying Schematics	46
4.5.1	Modifying Product Components	46
4.6	Simulation and Analysis	48
4.6.1	Running a Simulation and Generating Waveforms	48
4.7	Generating Summary Page and BOM	50
4.7.1	Generating and Printing a Summary Page	50
4.7.2	Generating and Saving a BOM	51
5	System Power Designs	52
5.1	Create a New System Power Processor Design	52
5.1.1	Create a New FPGA Processor Design and Schematic	52
5.1.2	Create a New Processor/SoC/Custom Load Design and Schematic	53
5.2	Next Steps	54
5.3	Modifying System Power Schematics	54
5.3.1	Add and Connect Product Components	54
5.3.2	Select a Component	55
5.4	Sequencing	57
5.4.1	Add a Sequencer	57
5.4.2	Edit the Group/Rail Assignments and View the Timing Diagrams	57
5.5	Generate a Summary Page and BOM (System Power)	58
5.5.1	Explore the System Power Tool Summary Page	58
5.5.2	Generate and Print a Summary Page	59
5.5.3	Generate and Save a BOM	59
6	Filter Designs	60
7	PLL/VCO Designs	61
8	EE-Sim SE (Offline Edition for Windows)	62
8.1	Download EE-Sim SE	62
8.2	Install EE-Sim SE	62
8.3	Start Using the EE-Sim Application for Windows	65
8.4	Download a Schematic	67

1 Getting Started

1.1 Introduction

As a registered member of the Maxim Integrated online community, you can use the Maxim EE-Sim® tool suite to design, simulate, analyze, and purchase a variety of analog and power solutions.

EE-Sim automatically creates a circuit schematic based on your requirements, saving you precious design time and resources. Set up and complete your simulations in just minutes. You can also take advantage of the following additional features of EE-Sim:

- Share your designs with a colleague.
- Order a BOM from your distributor of choice
- Electronically download, send, or print a complete design report with simulation graphs, schematics, and even your own custom annotations.
- Download your own free version of the EE-Sim Simulation Engines (EE-Sim SE) for more detailed and flexible simulation capabilities.

And while you are online using EE-Sim, don't forget to explore the other features and benefits of online membership with Maxim Integrated.

1.2 Basic User Prerequisites

This manual assumes you are familiar with basic use of the Microsoft Windows or Apple OSX operating systems, user interfaces, and supported web browsers. For example, you can click, double-click, hold your mouse down, drag, and release a mouse. You can also identify different mouse pointers or cursor icons and know what they mean. For example, wait for a spinning pointer or click a hyperlink with the familiar first finger of the Link Select mouse pointer. While no claim of ADA or Section 508 compliance is made, because this tool runs in a web browser, additional screen readers and input devices are considered compatible.

1.3 Conventions Used in This Manual

- Items in a list where you can make one or more choices or lists of substeps that you can perform in *any order* appear with bullets. For example:
 - Option 1
 - Option 2
 - Option 3
- Items in a procedure where you perform each step in a recommended and often required sequence appear in numbered and lettered lists. For example:
 1. Step 1
 2. Step 2
 - a. Substep 2a
 - b. Substep 2b
 3. Step 3

Verify that you complete a step before attempting the next step.

- Key areas of screen images appear with callout numbers in circles and are explained in greater detail with matching numbers in a table below the infographic. These infographics often imply a recommended sequence but they do not represent a series of required steps in a procedure. The screenshots are sometimes modified to demonstrate how the software behaves.
- Items in *italics* represent an emphasis in tone, a special term, or a specific field value that you can read on screen, select, or enter.
- Items in **bold** represent user interface labels for buttons, fields, messages, tabs, and other items that you can click with a mouse or tap with a supported touchscreen device.
- Items that appear underlined in a monospace font represent data values that you must enter exactly as they appear. For example, maximintegrated.com or 7.25.
- This manual advises you to *click* links and buttons. You might use a touchscreen device where you *tap* these items; however, this manual uses *click* as a standard term.
- This manual advises you to *press* keys on a keyboard. For example, press **Ctrl + S**. Instead of *typing*, we advise you to *enter* values using your choice of input device.
- This manual advises you to *select* an item. Where supported, you can click, tap, or use a keyboard to select an item.
- This manual advises you to *choose* from a menu or list of items. Where supported, you can click, tap, or use a keyboard to choose an item.

1.4 Register as a New User

As a new user, start here to register and create a MyMaxim account profile and password.

1. Open your web browser and navigate to www.maximintegrated.com.
2. At the top of the page, click **Register**. If your user name appears at the top of the page and you do not see a **Register** button, you are already registered and logged in. You can skip the remaining steps in this procedure.
3. If you arrived at the EE-Sim page through a shared design or another web link, and you are a new user, click **Register if you are a new user**.
4. Enter your contact information, e-mail address, and specify a secure password. You must enter a valid e-mail address. Your e-mail address is your user ID.
5. Click **Submit**.
6. Open the desktop application, web site, or mobile device you use to access e-mail for the account you used to register.
7. Look for a new e-mail message in your inbox with the subject line **Maxim Member Center Notifier** from the *Maxim Member System*. Open the message and click the activation link.
8. Congratulations! You are now a welcome new member at Maxim Integrated.

NOTE: By registering for a web account, you agree to the terms outlined in our Privacy Policy.

1.5 Start Using EE-Sim

As a registered user, you can now start using EE-Sim. You can start EE-Sim directly and create your own new designs or you can start the tool as the recipient of a shared design from another user.

1.5.1 Start EE-Sim as a New User

Use this procedure if you are new to Maxim Integrated and using EE-Sim for the first time.

1. In a supported web browser, navigate to www.maximintegrated.com.
2. You can start EE-Sim using any one of the following options:
 - Click the **Design** menu, click **Design Tools**, and then under **EE-Sim®** click **Design and Simulation Tools (Online)**.
 - Search for a part and click its Design Resources tab. For parts that are available in EE-Sim, under **Tools & Models** click the **Design and Simulate** link to open EE-Sim and load the part.
 - Create a bookmark or favorites link to www.maximintegrated.com/ee_sim.
3. If you did not already register, complete the steps in 1.4 Register as a New User and then try Step 1 again.
4. As a registered user with Maxim Integrated, you can now click **Login if you are a returning user** and begin using EE-Sim. If your user name appears at the top of the page and you do not see a **Login** option, you are already logged in and can skip the next step.
5. On the **Member Log In** page:
 - a. In the **User Name** field, enter your e-mail address.
 - b. In the **Password** field, enter your password for your Maxim account.
 - c. Click the **Log In** button.

6. On the EE-Sim main page:
 - a. Click the **My Designs** tab to view your saved designs and any designs that were shared with you.
 - b. Click the **New** tab to create a new design.

1.5.2 Start EE-Sim as the Recipient of a Shared Design

Use the steps below if you receive an invitation by e-mail to open a shared design.

NOTE: If this is the first time you are visiting the Maxim Integrated online member community, navigate to <https://memcenter.maximintegrated.com> and click **Register for Membership**. To register, complete the steps in 1.4 Register as a New User.

1. Open your e-mail application, web site, or mobile device app that you use to access e-mail (for example, Microsoft Outlook or Gmail).
2. Open the e-mail message about the shared design you have been invited to view:
 - a. Examine the subject line and notes at the bottom of the invitation. The owner of the design may have included special instructions for you.
 - b. The name of the design and your permissions appear. For example, you may have *Read/Write* permissions for one design and *Read Only* permissions for another design.
 - c. Click the **accept this invitation** link. If you already registered, you can click the link to the shared design in the sender's e-mail invitation.
3. If you are logged in, skip ahead to the next step. If you are not logged in automatically, complete the **Member Login** page:
 - a. In the **E-mail Address** field, enter the e-mail address that you used to register with Maxim.
 - b. In the **Password** field, enter your password for your Maxim account.
 - c. Click the **Log In** button.
4. On the EE-Sim main page:
 - a. Click the **My Designs** tab to view the shared design and any additional designs that you save or receive through sharing.
 - b. Click a design to open it.

1.5.3 Open an Existing Design

You can open and resume work on a saved design. For example, you closed your browser or may be using a different computer and want to re-open one of your designs. You can also use this procedure to open a shared design.

1. Open your web browser and navigate to www.maximintegrated.com/ee_sim/.
2. If you are logged in, click **Start the EE-Sim tool** and skip the next step.
3. If you are not logged in automatically, click **Login if you are a returning user** and complete the **Member Login** page:
 - a. In the **E-mail Address** field, enter the e-mail address that you used when you registered.
 - b. In the **Password** field, enter your password for your Maxim account.
 - c. Click the **Log Me In** button.
 - d. On the **Login Successful** page, click **Start the EE-Sim tool**.
4. Click the **My Designs** tab.

5. On the **My Designs** page, click the **Name** link or position your mouse over a design and click the **Open** button. The following message appears:
Starting a new design overwrites any changes in your current design.
6. Click **Start New Design**. EE-Sim opens the design at the last saved page in the design process.

1.5.4 Save Changes to Your Own Design

When you open your own personal design, you can make updates to it and save it using the same name or save it as a new design with a new name.

1. Click the **My Designs** tab.
2. On the **My Designs** page, click the **Name** link or position your mouse over a design and click the **Open** button. EE-Sim opens the design.
3. If another design is already open, the following message appears:
Starting a new design overwrites any changes in your current design.
4. Click **Start New Design**. EE-Sim opens the design.
5. Make any changes to the design.
6. Click the **Save** button to save your design. In the **Save Your Design** window, to update the design with your changes keeping the same name, click **Save** again.
7. To save your design changes as a new design, continue with the remaining sub-steps:
 - a. In the **Design Name** field, enter a unique new name to differentiate this design from your other designs as well as the shared designs of other users. For example, save the *MAXIM 17598 MyDesign1* design as *MAXIM 17598 MyDesign2*.
 - b. In the **Design Description** field, enter a short description of the modified design for you and any recipients if you later decide to share the design.
 - c. Click **Save**.

1.5.5 Save Changes to a Shared Design

When you open a shared design, you can save your changes as a new design. If you have Read/Write access, you can also overwrite the original design.

1. Click the **My Designs** tab.
2. On the **My Designs** page, click the **Name** link or position your mouse over a design and click the **Open** button. EE-Sim opens the design.
3. If another design is already open, the following message appears:
Starting a new design overwrites any changes in your current design.
4. Click **Start New Design**. EE-Sim opens the design.
5. Make any changes to the design.
6. Click the **Save** button to save your design.
7. If you have Read/Write permission, you can overwrite the original design. Your updates are applied to the design and it maintains the same name. The person who shared this design with you can also view these changes. In the **Save Your Design** window, click **Save** again.
8. If you had Read-Only access to the shared design or simply want to save your shared design changes as a new personal design that is not shared, continue with the remaining sub-steps:
 - a. In the **Design Name** field, enter a unique new name to differentiate this design from your other designs as well as the shared designs of other users. For example, save the *MAXIM 17598 MyDesign-001* design as *MAXIM 17598 MyDesign-002*.

- b. In the **Design Description** field, enter a short description of the modified design for you and any recipients if you decide to share the design.
- c. Click **Save**.

1.5.6 Close EE-Sim

EE-Sim is designed for ease-of-use. After you login, you can end your session at any time and resume work again without being forced to logout or log back in again.

Follow these steps to end your session.

1. Click the **Save** button to save any changes you made to your design.
2. Close your browser.

NOTE: The next time you start EE-Sim, you are logged in automatically unless you manually or automatically clear cookies from your browser, or you log out of the Maxim website. If you delete your cookies or logout of the Maxim website and then revisit the website, you are prompted to login again to confirm your identify.

1.6 Web Browsers Support Easy Automatic Logins

When you log in to the Maxim Integrated web site, you can rely on standard security protocols to keep you logged in as a convenience. If you return to the site and are not automatically logged back in, you will have to manually enter your login credentials again. You may encounter this behavior for any of the following reasons, all involving options available to you through your choice of supported web browser (Microsoft Internet Explorer 9 or higher, Google Chrome, or Mozilla Firefox):

- You cleared your browser cookies at any time after your last successful login. Cookie settings might be cleared on a shared workstation by a network security policy, or cleared from your own PC as a personal preference, or by your anti-virus program.
- You are browsing in your web browser's private or incognito mode.
- You are using a different browser, computer, or device from the one you used to login last time.

2 Designs, Contacts, and Sharing

2.1 My Designs

There is no particular procedure that you must follow when it comes to managing your designs. As you create and share them, your design list will grow. Refer to the following image to get started.

The screenshot shows the EE-Sim 'My Designs' interface. At the top, there are tabs for 'New', 'My Designs' (selected), 'Maxim Designs', and 'Download'. A 'Return to Current Design' button is visible. Below this, a table lists saved designs with columns for Name, Date, Status, and Type. The table is sorted by Date in descending order. A detailed view of a design is shown on the right, displaying its description, date, status, type, and sharing options (Open, Share, Delete). The sharing section shows that the design is not shared with anyone.

Name	Date	Status	Type
George N. Jinere Great new design for customers in new s...	10/25/2013 4:48 PM	Owner	DC-DC
ED-MAX-16907/09 DRAFT-001 DC-DC design description.	10/25/2013 4:45 PM	Owner	DC-DC
20131025-MAX-17597-DESIGN-1 Government customer interested in our p...	10/25/2013 4:43 PM	Owner	DC-DC
MAXIM 17598 20131019-002 Version 2: A new approved design with a...	10/25/2013 4:26 PM	Owner	DC-DC
MAXIM 17598 20131019-001 A new approved design with approved pa...	10/25/2013 4:25 PM	Owner	DC-DC
Design 20131024-001 Description.	10/24/2013 4:01 PM	Owner	DC-DC
System Power Design 004 System Power design for 12-rail process...	10/19/2013 9:24 AM	Owner	System-Power
New Design 03 A new design for project P2 for 2015 Q1.	10/19/2013 9:15 AM	Read Only	DC-DC
My Original Design 001 Original shared design from my colleague.	10/19/2013 6:10 AM	Owner	DC-DC
2014 MyDesign 002 A second design based on the MAX 175...	10/19/2013 6:09 AM	Owner	DC-DC

Showing 1 - 10 of 21

Navigation: First Previous 1 2 3 Next Last

Design details for 20131025-MAX-17597-DESIGN-1:

- Date: 10/25/2013 4:43 PM
- Status: Owner
- Type: DC-DC
- Design not shared with anyone.
- Buttons: Open, Share, Delete

Design details for System-Power:

- Shared: my.contact@who.net
- Permission: Read Only
- Buttons: Open, Share, Delete

- 1 My Designs:** Click the **My Designs** tab to view, manage, sort, open, share, and delete your designs. If you navigate to the **My Designs** page from an open design, a **Return to Current Design** button appears to take you back to the last page you were viewing so that you can continue working on the open design. A button may also appear for the last EE-Sim design module you had open. Possible button names include **Return to DC-DC Tool**, **Return to System Power Tool**, **Return to PLL Tool**, or **Return to Filter Tool**.
- 2 Header Labels Show the Sort Order:** Click a column header to toggle the ascending or descending sort order for each column. In this example, the entire table of designs is sorted by date in descending order and is indicated by the arrow pointing down in the **Date** column header.
- 3 Open a Design:** Click the design name hyperlink to open a design. The value in the **Status** field indicates your permissions including *Read Only*, *Read/Write*, or *Owner*.
- 4 Sharing:** Position your mouse over a row in the designs table to view its full description, shared contacts, and permissions. Available buttons include **Open**, **Share**, and **Delete**. In the top example, the owner of a DC-DC design has not shared it with anyone. In the bottom example, a contact person has been granted Read-Only permission to a System-Power design.
- 5 Navigation:** Use the convenient links at the bottom of the list to navigate through multiple pages with up to ten (10) designs appearing on each page.

2.1.1 Create a New Contact

Before sharing a design with a colleague, you must add them as a new contact.

1. Click the **My Designs** tab.
2. Click the **Go to My Contacts** button.
3. In the **Add New Contact** field:
 - a. Enter the e-mail address for your new contact.
 - b. Click **Add Contact**.
4. In the **Invite Preview** section:
 - a. In the **Subject** field, enter a subject line for the e-mail message to your new contact.
 - b. In the **Message** section, enter a custom greeting to follow the **Hello** line and your name as the person who wants to add you as a contact on Maxim EE-Sim. You can also add custom notes at the bottom of the invitation.
5. Click **Add Designs to Share** to assign permissions to one or more of your designs for your new contact to view or edit them. In the **Share multiple designs...** window:
 - a. Select the **Read/Write** option to enable the new contact to edit the shared design.
 - b. Select the **Read Only** option to enable the new contact to view your design. Your original design is preserved. The recipient can save their own copy of the design.
 - c. Select the **No Access** option to restrict permissions. Designs with this option are not shared.
 - d. Click **Apply**.
6. Review the invitation and click **Send Invite**.

NOTE: New contacts may appear in the **Pending Contacts** section until they accept your invitation.

7. (Optional) To revise the invitation, click **Resend Invite**.
8. To return to your designs, click the **Go to My Designs** button.

2.1.2 Manage Your Contacts

EE-Sim helps you organize your contacts, send e-mail invitations, and set sharing permissions for collaboration in viewing, approving, or developing new designs.

1. Click the **My Designs** tab.
2. Click the **Go to My Contacts** button.
3. In the **My Contacts** section:
 - a. Click a column header to sort your contacts by their e-mail account or by the number of designs you have shared with *Read/Write* or *Read Only* permissions.
 - b. Position your mouse over a contact to view the names of any shared designs.
 - c. Click **First** or **Last** to jump to the first or last page in the list.
 - d. Click **Previous** or **Next** to go back or advance one page at a time.
 - e. Click a page number to view that page of ten contacts. The current page is shown with a border around its number.
4. Click **Manage** to set the design sharing permissions that you want to grant to this contact, if any. In the resulting **Share multiple designs...** window:
 - a. Click a column header to sort the list by design name or permitted level of access.
 - b. Click **Apply** to save any new permissions.
 - c. Click **Preview and Send Invitation** to notify your contact with a personalized message about the design sharing changes you just made.

- d. (Optional) Click **Share with a new contact** to exit this window and share designs with a new contact. To learn more, see *2.1.1 Create a New Contact*.
5. New contacts are added to the **Pending Contacts** section when their e-mail address is not recognized as an existing EE-Sim user. In the **Pending Contacts** section, you can perform any of the following actions:
 - a. Click a column header to sort your contacts by their e-mail account, invitation date, shared designs, or sharing action.
 - b. Click **First** or **Last** to jump to the first or last page in the list.
 - c. Click **Previous** or **Next** to go back or advance one page at a time.
 - d. Click a page number to view that page of ten contacts. The current page is shown with a border around its number.
 - e. Click **Resend Invite** to adjust any design sharing permissions, edit your personalized invitation, and e-mail it to the pending contact again.
6. In the **Add New Contact** section, enter an email address and click **Add Contact** to begin the sharing process or just notify another contact.
7. Click **Go to My Designs** when finished to return to your list of designs.

2.1.3 Share a Single Design

Use this procedure to share a specific design with a contact. You have two options: start at Step 1 or Step 2.

1. (Option 1) On the **My Designs** page, position your mouse over the design you want to share. In the dynamic status area that appears on the right side, click **Share**.
 - a. In the **Manage Permissions** window for the selected design, select *Read/Write*, *Read Only*, or *No Access* for each contact in the list. (This option enables you to share the design with multiple contacts.)
 - b. (Optional) Click **Apply** to save your settings.
 - c. Click **Preview and Send Invitation**.
2. (Option 2) Open a design and click the **Share** button in the upper right corner of the Schematic page.
 - a. In the **Share Your Design** window, in the **Share With** field, select a contact or click **Add Contact** to enter a new contact.
 - b. In the **Set Permissions Level** field, choose *Read Only* or *Read/Write*.

NOTE: For both options, continue with the following common steps.

3. In the **Subject** field, enter a short title for the e-mail message to your new or existing contact.
4. In the **Message** section, EE-Sim shows **Hello** and inserts your name as the person who is sharing a design. You can edit the name. You can also add notes in the **Additional comments** field at the bottom of the invitation.
5. Review the invitation and click **Send Invite**.

2.1.4 Share Multiple Designs

Use this procedure to share multiple designs at the same time with a single contact.

1. On the **My Designs** page, click **Go to My Contacts**.
2. On the **My Contacts** page, locate a specific contact in the list and click the **Manage** button.
3. In the **Share Multiple Designs** window:
 - a. Select *Read/Write* or *Read Only* for each design in the list. Select *No Access* to disable sharing of that design.
 - b. (Optional) Click **Apply** to save your settings.
 - c. Click **Preview and Send Invitation**.
4. In the **Subject** field, enter a short title for the e-mail message to your contact.
5. In the **Message** section, EE-Sim shows **Hello** and inserts your name as the person who is sharing a design. You can edit the name. You can also add notes in the **Additional comments** field at the bottom of the invitation.
6. Review the invitation and click **Send Invite**.

2.2 Use Reference Designs from Maxim

The **Maxim Designs** tab includes a set of reference circuit designs built and tested by the experts at Maxim Integrated. Use a reference design to accelerate your productivity. Save time by basing your new schematic on a proven existing design. Many of these designs are also available for purchase as evaluation boards. Reference designs identified as MAXREFDES are available for immediate purchase.

Follow these steps to create a new design based on an existing reference design:

1. Open your web browser and navigate to www.maximintegrated.com/ee_sim/.
2. Click **Start the EE-Sim tool**. If you were not automatically logged in, click **Login if you are a returning user**.
3. Click the **Maxim Designs** tab. The **DC-DC Converters** section expands.

NOTE: This release of EE-Sim provides Reference Designs from Maxim for DC-DC Converter schematics only.

A list of sample designs appears by name, type, and part number. Click a column name in the heading row to sort the list. The following additional details appear:

- **Vin-min:** The minimum input voltage.
 - **Vin-max:** The maximum input voltage.
 - **Vout:** The output voltage.
 - **Iout:** The output current.
 - **# Outputs:** The number of outputs in the design.
4. Click anywhere in the row of the reference design that you want to open.

NOTE: The original reference design cannot be changed. You are opening a copy of the design, similar to a template.

5. Adjust the schematic only as required. Remember, you are working with a valid reference design. If you make too many edits, you can defeat the very purpose behind building new designs based on a reference design.
6. Click **Save**.

3 DC-DC Converter Designs V2 (Beta)

ALERT: A new version (V2) of the DC-DC Design Tool is in Beta test. This chapter describes this new version V2. For help with the previous version of the DC-DC Design Tool (V1), please refer to Chapter 4: DC-DC Converter Designs V1.

Part number determines whether version V1 or version V2 is used. Parts identified with a purple asterisk (*) on EE-Sim's New tab are available in V2. Parts without a purple asterisk remain in V1.

Note that "Beta" is displayed in the upper right corner of the tool instead of "DC-DC" when V2 is running.

As a registered member of the Maxim Integrated online community, you can use the Maxim EE-Sim DC-DC Converter tool to design, modify, simulate, analyze, and purchase a variety of power solutions, including step-up, step-down, and isolated configurations.

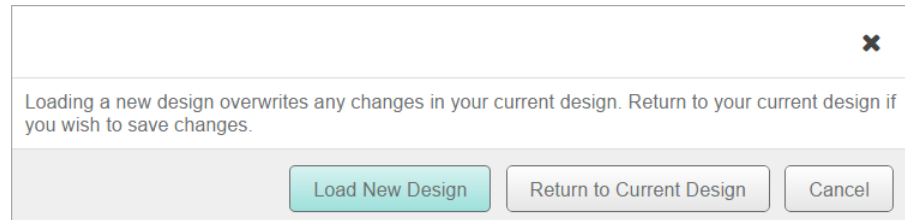
EE-Sim automatically creates a circuit schematic and BOM based on your requirements, saving you precious design time and resources. Set up and complete your simulations in just minutes without having to learn the complexities of the simulator. You can also take advantage of the following additional features of EE-Sim:

- Share your designs with a colleague.
- Order a BOM from your distributor of choice.
- Print a complete report.
- Download your own free version of the EE-Sim Simulation Engines (EE-Sim SE) for more detailed and flexible simulation capabilities.
- Download a copy of your design from the DC-DC converter tool for use with EE-Sim SE.

3.1 Open an Existing Design

You can open one of your existing designs or a pre-designed template from Maxim.

1. Click the **My Designs** tab to open one of your saved designs.
2. For DC-DC Converters only, click the **Maxim Designs** tab to open one of the pre-designed schematics available from the engineers at Maxim. These designs represent circuits that were designed, built, and tested in a laboratory environment.
3. You may be prompted by the message below:




- a. Click **Cancel** to ignore your last selection and return to the previous page.


- b. Click **Return to Current Design** to see where you were last working. If the design is valid, keep working on it, click **Save**, and name that design. If the design was not worth saving, you can load the new design.
- c. Click **Load New Design** to discard the previous current design and start a new one.

NOTE: You may not be aware that you have another design open, known as the *current design*. The current design is simply the last design you were working on and EE-Sim remembers it so you can go back to it with ease. When in doubt, click **Return to Current Design** to check on your work and save it if you want to keep it. If the current design does not need to be saved, you can click **Load New Design** with confidence.

3.2 Create a New Design

You can use EE-Sim to create an unlimited number of new designs. After entering your detailed input requirements, you can generate an interactive schematic with components you can modify.

1. Open your web browser and navigate to www.maximintegrated.com/ee_sim/.
2. Click **Start the EE-Sim tool** or **Login if you are a returning user**.
3. If you are logged in, skip ahead to the next step. If you are not logged in automatically, complete the **Member Login** page:
 - a. In the **E-mail Address** field, enter the e-mail address that you used when you registered.
 - b. In the **Password** field, enter your password for your Maxim account.
 - c. Click the **Log Me In** button.
 - d. On the **Login Successful** page, click **Start the EE-Sim tool**.
4. On the **New** tab, select **DC-DC Converters**.
5. Expand the **Browse All Power ICs** section:
 - a. Click the + icon to expand a product category to view a list of Maxim products.
 - b. Click a part number to create a new design based on that part.
 - c. (Optional) Click the document icon  to view additional product information including an overview, product data sheet, design resources, and ordering details.
6. (Optional) Instead of browsing all power ICs, you can expand the **Parametrically Select a Switch-Mode Power Supply IC** section to select a part based on your criteria:
 - a. Enter an input voltage range and specify up to two outputs.
 - b. Select the converter type and features you need.
 - c. Search, sort, and browse the list of matching converters in the Choose Converter section.
 - d. Click a part number to create a new design based on that part.
7. The **Design Requirements** page appears. EE-Sim displays the part number you selected in the upper left corner.
For example:

Part Number: MAX17598 


Design Name: Save Design
8. (Optional) To view a PDF datasheet, click the PDF document icon for the part.
9. Continue to the next topic to specify your design requirements.

3.3 Specify Input, Output, and Other Design Requirements

EE-Sim fills in default design requirements for the part you selected. Use this procedure to edit those values before generating a new schematic.

1. On the **Design Requirements** page:
 - a. In the **Input Requirements** section, enter your input values in each field.
 - b. In the **Output Requirements** section, enter your output values in each field.
 - c. In the **Design Priorities** section, specify the cost and performance considerations that you want to emphasize in the **Performance Tradeoff** and **Cost Tradeoff** fields. You can choose to optimize your design for efficiency or small size, or even to balance the design between both factors. For cost trade-offs decide between higher performance or lower cost.
 - d. In the **Design Criteria** section, enter your settings in each field.
2. If available, click **Show Advanced** to view additional requirements. Click **Hide Advanced** to hide the additional requirements and simplify the current page.

NOTE: The sections and fields that appear may vary by part. Also be aware that hidden advanced requirements are still used in the design even though you may choose not to show them in your current browser window.

3. Apply any of the following tips to save time and improve accuracy:
 - a. Press the **Tab** key to move to the next field.
 - b. Verify that the values you enter are in the correct field and in the required units.
 - c. Position your mouse pointer over a field to see a tooltip. For example, the tip might show the acceptable minimum and maximum values for a specific field.
 - d. In Internet Explorer 10 and 11, you can click a small **x** to clear the value of a field.
 - e. In fields that require a limited set of acceptable values, you can enter a value using any of the following methods:
 - Click the  drop-down menu icon and choose a value.
 - Enter (type) the first digit of the closest matching value.
 - Press the **Tab** key to enter the field and then press the **Up** or **Down** arrow keys.
4. A message appears if your entry is not acceptable. The tool automatically reverts to the last acceptable value. Read the on-screen tip and adjust the value as advised.
5. (Optional) Click the **Restore Defaults** button to revert all fields back to their original values.
6. Continue to the next topic to generate a schematic.

3.4 Create a Schematic and Save Your Design

In the two previous procedures, you selected a part to create a new design and entered your design requirements. Follow these steps to generate a schematic that meets those requirements and save your new design.

1. When all your values have been entered on the **Design Requirements** page, click **Create Design**.
2. EE-Sim performs a complex set of calculations to design a circuit that meets your requirements. The tool selects commercially available components to satisfy your design requirements. A visual representation of your design appears on the **Schematic** page. Click the **Save** button or the **Save Design** link to save your design. In the **Save Your Design** window:
 - a. In the **Design Name** field, enter a unique name to differentiate this design from your other designs as well as the shared designs of other users.
 - b. In the **Design Description** field, enter a short description of the design to remind you later of its purpose. The description is also helpful for any recipients if you decide to share the design.
 - c. Click **Save**.

3.5 Next Steps

Congratulations! You generated a schematic and saved your design. You can now perform one or more of the following tasks:

Task:	Step:	Learn More:
To adjust your design requirements:	Click the Design Requirements tab to change your design requirements and then click Create Design to generate a new schematic. A new version of the design is added to the History.	3.3 Specify Input, Output, and Other Design Requirements Specify Input, Output, and Other Design Requirements
To run simulations:	Click the Schematic tab and click Simulation .	3.8 Simulation and Analysis
To edit your schematic:	Click the Schematic tab.	3.6 Edit a Schematic
To compare design versions:	Click the Compare tab.	3.9 Compare Design Iterations
To view a summary report of your design and download a BOM:	Click the Report tab and perform any of the available options.	3.10 Generate a Design Report and BOM (DC-DC)
To download your designs:	Click the Download tab and perform any of the available options.	7.4 Download a Schematic



NOTE: Although there is an implied left to right sequence among the application tabs in EE-Sim, you are not required to visit every tabbed page. For example, you could click the **Report** tab to generate a report without running any simulations and without viewing the **Compare** tab.

3.6 Edit a Schematic

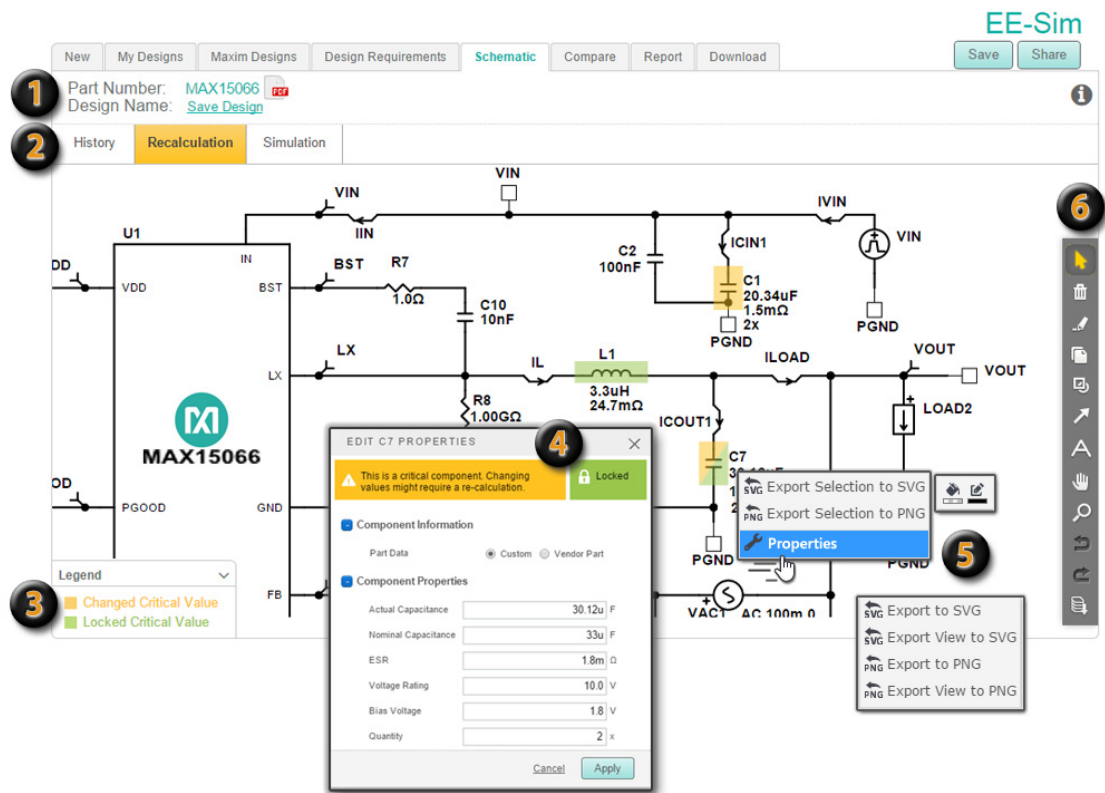
3.6.1 Edit Component Properties

You can adjust the properties of the components in your schematic. Some components are considered *critical* to the design and other parts are not. When you adjust critical component values, the application flags them for your attention by applying a highlight color to both the component you changed and the **Recalculation** button. This change in appearance alerts you to edits that impact the values in other components. You can recalculate their values.

1. Open a design and click the **Schematic** tab.
2. To adjust the basic visual settings of parts, including fill color, line color, dash, and width, right-click a line or component and adjust the settings available in the pop-up menus. You can also define custom colors by their RGB, HSB, or hexadecimal values.
3. Double-click a component to open it. You can also right-click a component and choose **Properties**.
4. In the **Edit Properties** window:
 - a. Click **+** to expand a section to view its available properties. Click **-** to collapse a section.
 - b. For critical components, observe the appearance of the following message:

 **This is a critical component. Changing values might require a re-calculation.**
 Changing a critical component can substantially alter the performance of the circuit. After changing critical component values, recalculation is recommended.
 - c. For critical components, observe the appearance of the  **Unlocked** message. You can lock a critical component to prevent its values from changing later when you click **Recalculation**. Click the padlock to toggle this setting between **Locked** and **Unlocked**.
 - d. In the **Component Information** section locate the **Part Data** field. Click **User-Defined** to set your own custom component parameter values or click **Vendor** to view the currently selected component. Click **Select Vendor Part** to view a list of other parts that meet your filter criteria. To learn more, see 3.6.2 Select a New Vendor Part.
 - e. Click **Apply**.
5. Continue editing the schematic as necessary. When you edit a critical component, the **Recalculation** button and the critical component you just changed appear in an orange color.
6. When your edits are complete, click **Recalculation**. A warning message appears to advise you that unlocked component values might change. To continue with the recalculation, click **Yes**. To go back and adjust which components are locked and unlocked, click **No**.
7. When you decide to click **Recalculation** and then click **Yes**, evaluate the design changes by observing the schematic or use the **Compare** tab to see a list of differences between the current version of the design and any prior versions in the history. Continue to adjust the values and recalculate as often as needed.
8. Click **Save** when complete.

NOTE: Each time you recalculate, a new version of your schematic is added to the version history for the current design.

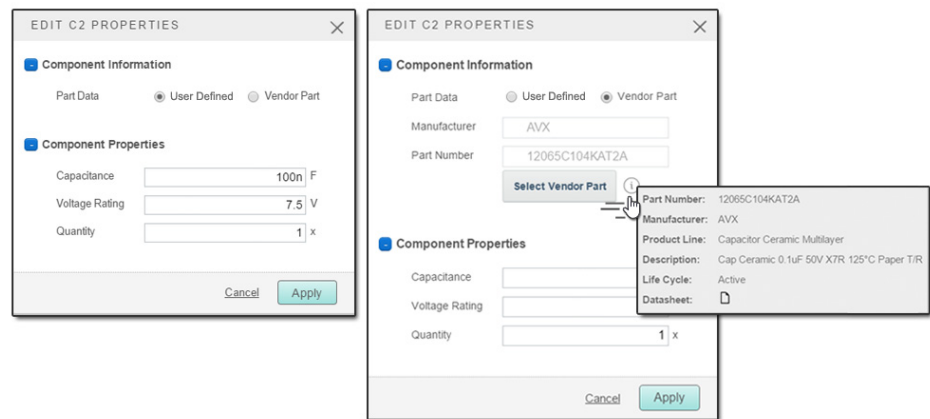


- 1 Click the part number or PDF icon to view the data sheet. Click **Save Design** or the **Save** button at right to save your new design.
- 2 When the **Recalculation** tab is highlighted, click it to perform adjustments to your schematic based on pending changes you made to critical components.
- 3 As the **Legend** reminds you, critical components with changes are flagged in the diagram in orange. Critical components with locked values appear in green. Critical components that have been changed and are locked appear in both colors (for example, **C7**).
- 4 Double-click a component to edit its properties. Critical components feature an orange banner at the top of the properties window. A component shows its locked or unlocked state with a green banner on the properties window and a padlock icon that appears in the locked or unlocked state.
- 5 You can right-click in a schematic to view options including export to SVG or PNG, edit properties, and adjust fill or line colors.
- 6 Use the new schematic toolbar to apply annotations, zoom and pan, and export the schematic image.

3.6.2 Select a New Vendor Part

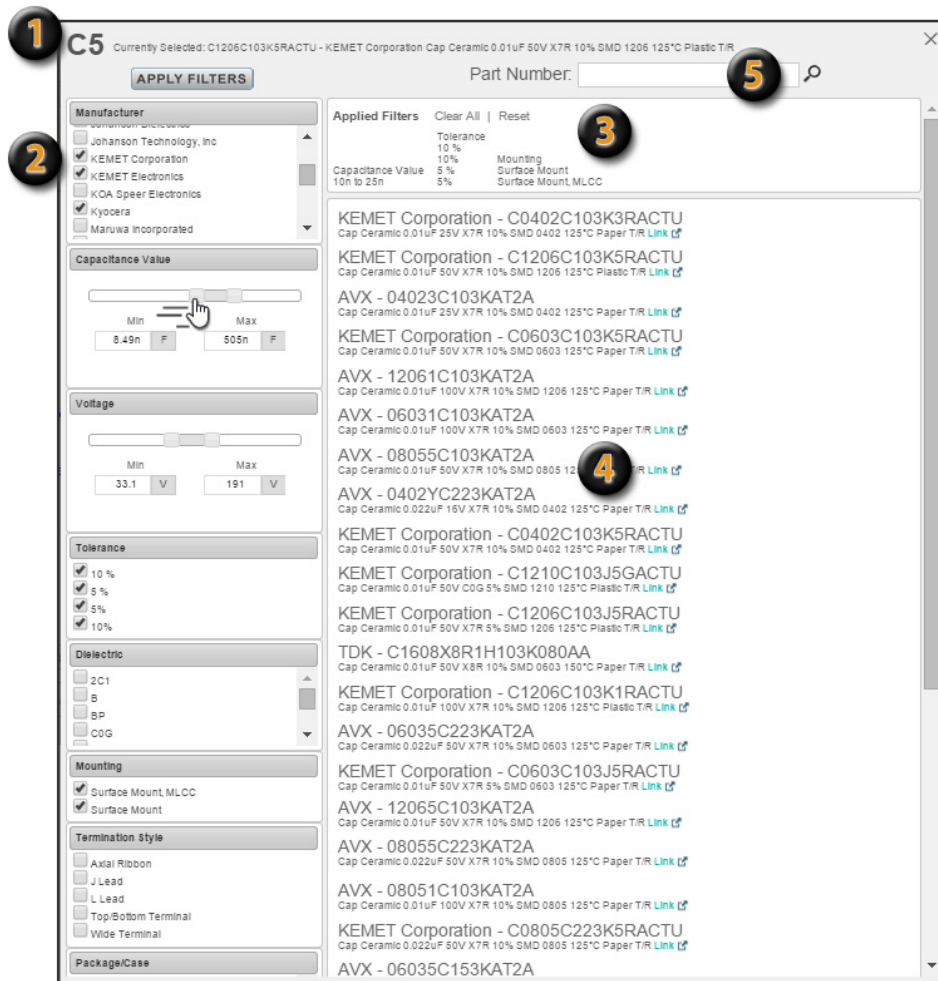
You can change component values, secondary parameters, and even select specific manufacturer part numbers for most components in the schematic. You can choose from a library of appropriate purchasable components or just supply the key values for a component without selecting a purchasable part.

1. Open a design and click the **Schematic** tab.
2. Double-click a component to open and edit it. You can also right-click a component and choose **Properties**. In the example shown below, the C2 capacitor from a MAX 15066 design is opened in the schematic diagram.
3. In the **Edit Properties** window:
 - a. If it is not already expanded, click + to expand **Component Information**.
 - b. In the **Part Data** field, choose **Vendor Part** to view the chosen manufacturer and part number.



- c. Click the **Select Vendor Part** button to view a list of other parts that satisfy the requirements for this design. You will also see the filter settings used to select these parts from the part database.
- d. Search for a different part by modifying one or more filters to search for the required manufacturers, attributes, and products.
- e. Click **APPLY FILTERS** to view a list of potential matching parts. To learn more, click the link below a part. When you are ready to select a different part, click the entry to swap the old part for the new one.
- f. Review the fields in the **Component Properties** section. For example, **Capacitance**, **Voltage Rating**, and **Quantity**.
- g. Click **Apply**.



Applying filters to select a different vendor part is demonstrated in the graphic on the next page.




- 1 Selected Part:** The top of the window shows the currently selected part.
- 2 Available Filters:** This section lists your search options. Default settings are based on the design requirements that you entered for your design before generating the schematic and best practices for this part as determined by Maxim's applications engineers. If you make changes to the filter settings such that you widen a filter, you may get parts that no longer satisfy the needs of the circuit. Do so with care and proper circuit design knowledge. For items with sliders you can either move the sliders or modify the data in the boxes at either end of the sliders. After you have complete any changes to the filter settings, Click the **Apply Filters** button to find the parts that match your newly modified criteria. Click **Reset** to restore default values and Clear All to remove all values, which allow you to start the filtering process *from scratch*.
- 3 Applied Filters:** This section reminds you of the search criteria that were used to generate the current list of matching parts.
- 4 Results:** Click [Link](#) for a part number to learn more about the product and manufacturer. Click on the part number or description to replace the currently selected part with this new one.
- 5 Search:** Search for a specific component (filters are not applied).

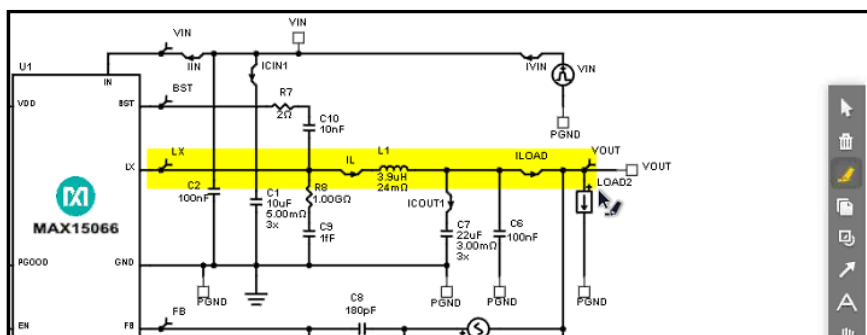
3.6.3 Annotate a Schematic Using the Toolbar







Use the convenient toolbar to annotate, markup, adjust the view, resize, or export an image of your schematic.

1. Open a design and click the **Schematic** tab.
2. To adjust the basic visual settings of parts, including fill color, line color, dash, and width, right-click a line or component and adjust the settings available in the pop-up menus. You can also define custom colors by their RGB, HSB, or hexadecimal values.
3. To select specific components and adjoining lines in the schematic, click  **Select Items**. For example, you can change the line and fill colors or export an image of a selected item. This standard mouse pointer is the default toolbar button setting. To select multiple components at the same time, click down once and drag a box around multiple parts.
4. To delete a specific shape, text, highlighted area, or other annotation, click  **Delete Items**. Position the pointer with the small trash can over the annotation items that you want to delete and click each one to remove them.






Tip: Click **Undo** if you accidentally delete an item and want to restore it. Circuit components are protected. You cannot delete them.

5. To highlight an area of interest (for example, a high-current path), click  **Draw Highlight** and then mark up a specific section in your design by clicking and dragging. An example appears below:





6. To copy the schematic as an image click  **Copy Image to Clipboard**. You can paste the schematic image to another application such as Word or PowerPoint.
 - a. Click  **Copy Schematic Window Image to Clipboard** to take the current view adjustments that you made to the schematic into consideration. Only the portion of the schematic that fits within the current browser window is copied. For example, you zoomed in and panned the image to examine a particular area.
 - b. Click  **Copy Complete Schematic Image to Clipboard** to ignore any custom view adjustments (zoom, pan). The entire schematic is copied.
 - c. Either option generates a small .png file in your browser. Right-click the image and save the file to your computer or copy the image to your computer's internal clipboard. To paste the image, click Paste-Special and choose Device Independent Bitmap.
 - d. Click **Close**.
7. To draw a circular or rectangular shape around one or more components, click  **Shape Tools**. Then, specify the type of shape you want to add ( **Draw Ellipse** or  **Draw Rectangle**). Click and drag directly on the schematic to draw a circle, oval,

rectangle, or square shape. To insert text, double-click the shape outline. Right-click the shape to change the font and colors.


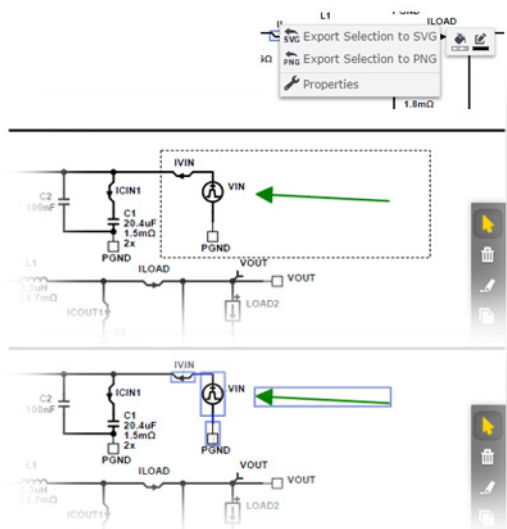

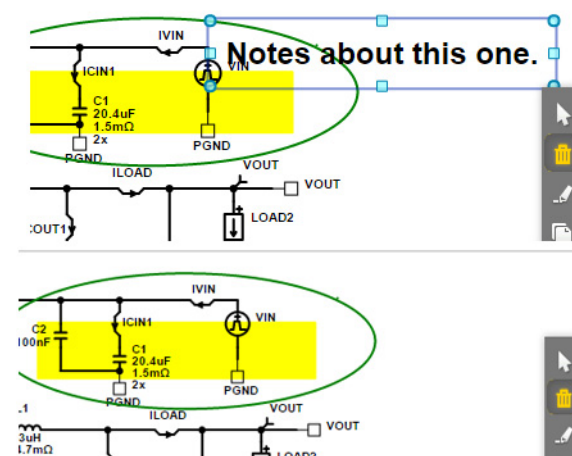

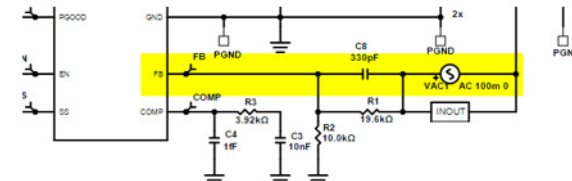


8. To draw arrows in the schematic, click the  **Draw Arrow** tool.
9. To annotate the schematic with a short custom text block, click  **Text Box**.
 - a. Click the area of the design where you want the text to appear.
 - b. In the resulting **INPUT TEXT** box, type your custom text and click **Apply**.
 - c. Right-click a text box to change the font and colors.
10. To adjust the position of the schematic in your browser window, click  **Pan**. Click and hold down the mouse button as you drag the schematic in any direction.
11. To adjust the magnification of the schematic, click  **Zoom Tools**. From left to right, zoom options include:
 - **Reset Zoom:** Click this option to restore the original magnification to the default zoom of 100%.
 - **Zoom to All Components:** Click this option to magnify the view in or out to a standard size that fits all components into the available view.
 - **Zoom Out:** Reduces the magnification so you can view more components; however, they appear at a smaller size.
 - **Zoom In:** Increases the magnification so you can view fine details about specific components; however, as you zoom in you see fewer components.
 - **Area Zoom Tool:** Define a box around a particular component or set of components to zoom in on a precise area.
12. To step back in time and undo the last action that you applied to the schematic, click  **Undo Last Action**. Use this command to erase unwanted edits such as components that you accidentally added, moved, adjusted, or deleted. When the command is not available, the icon is grayed out to indicate that there is no recent action to undo.


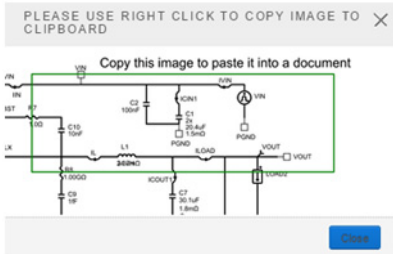

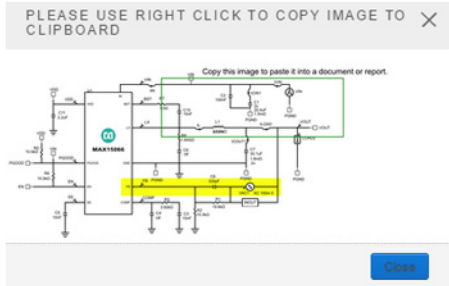



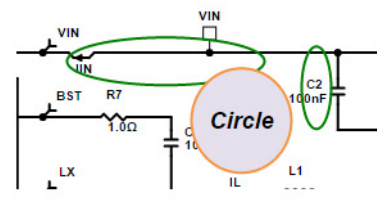

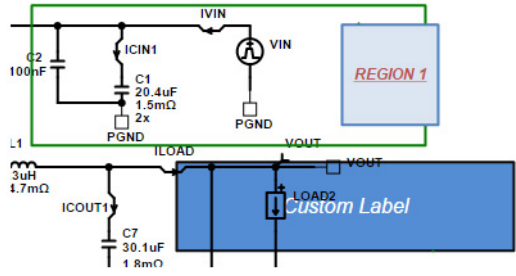

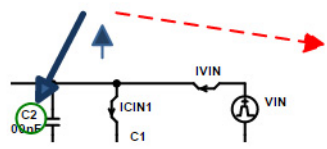

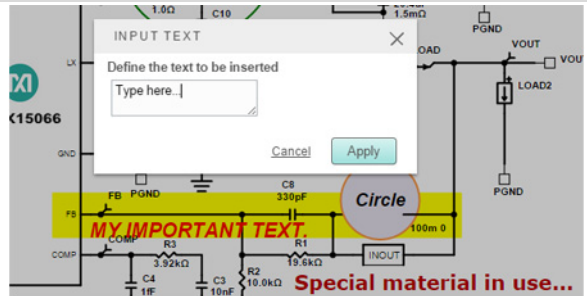
NOTE: Some actions cannot be undone. For example, if you resize a text box, you cannot undo this action by clicking Undo. Instead, resize the text box again.


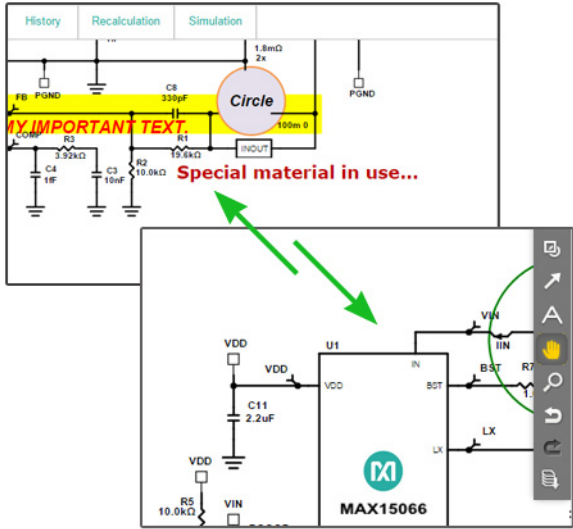



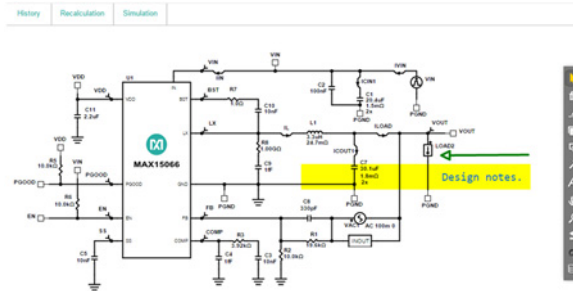

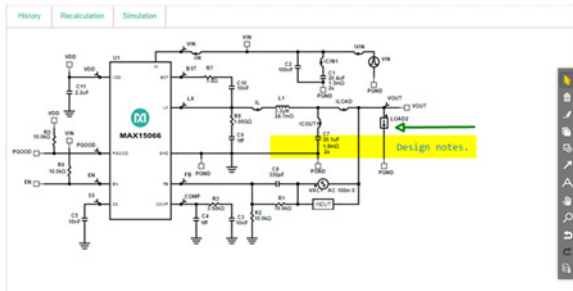

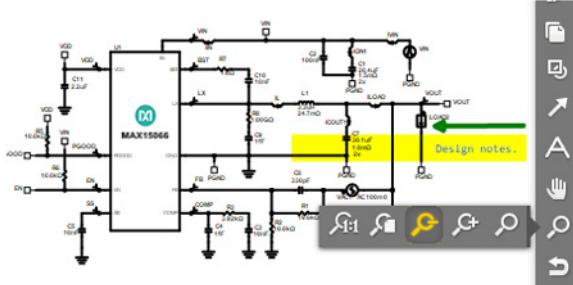
13. To reverse an **Undo** command, click  **Redo Last Action**. When the command is not available, the icon is grayed out to indicate that there is no recently undone action to redo.
14. To export an image of the schematic, click  **Export Schematic Image**. Select one of the following image formats and then click **Export File**:
 - Bitmap (BMP)
 - JPEG (JPG or JPEG)
 - Portable Network Graphics (PNG)
 - Scalable Vector Graphics (SVG)
 - Tagged Image File Format (TIF or TIFF)
 - Windows Metafile (WMF)


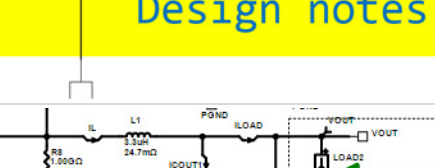
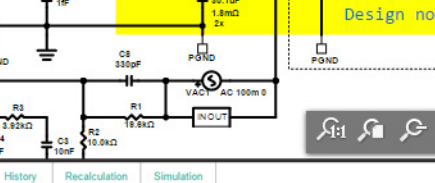




3.6.4 Schematic Toolbar Reference Chart

Refer to the following examples when working with the schematic toolbar.

Toolbar Button:	Function:	Examples:
 Select Items	<p>Selects components, annotations, and groups of both (multi-select inside a screen area that you define).</p> <p>Standard mouse pointer used for right-clicking components and annotations to set properties.</p> <p>Can also be used to click an annotation to select it and press the Delete key to remove the item.</p>	
 Delete Items	<p>Deletes the selected annotation item. In this example, custom text notes are deleted.</p>	
 Draw Highlight	<p>Highlights an area in the schematic.</p>	
 Copy Image to Clipboard	<p>Expands to show two options for copying the current schematic.</p>	

Toolbar Button:	Function:	Examples:
 <p>Copy Schematic Window Image to Clipboard</p>	Enables you to copy only the portion of the schematic that is visible in the window.	
 <p>Copy Complete Schematic Image to Clipboard</p>	Enables you to copy the entire schematic.	
 <p>Shape Tools</p>	Expands to show the options for drawing shapes.	
 <p>Draw Ellipse</p>	Draws an oval or circle.	
 <p>Draw Rectangle</p>	Draws a rectangle or square.	
 <p>Draw Arrow</p>	Draws an arrow.	
 <p>Text Box</p>	Allows you to enter text. When you click Apply, the text is inserted in the schematic.	

Toolbar Button:	Function:	Examples:
 Pan	<p>Moves the schematic up, down, left, or right.</p> <p>Tip: After you zoom in, pan the image to pinpoint specific regions.</p>	
 Zoom Tools	<p>Expands to show the view magnification (zoom) options.</p>	
 Reset Zoom	<p>Resets any previous zoom settings and restores the default view.</p>	
 Zoom to All Components	<p>Fits the entire schematic onto the current page. The image appears smaller because all components are included.</p>	
 Zoom Out	<p>Zooms out one level. With each click, the image appears smaller because your view is relative to a point that is going out, away from the schematic.</p>	

Toolbar Button:  Zoom In	Function: Zooms in one level. With each click, the image appears larger because your view is relative to a point that is going in, closer to the schematic.	Examples: 
Area Zoom Tool	Enables you to define an area in the schematic and then magnifies it (zooms in) to show as much of it as possible in the current view. In this example, the user defines the rectangle around the Design notes text and arrow (top) with the Area Zoom Tool before it expands (bottom).	
 Undo	Reverses the last action. This command is not always available.	
 Redo	Reverses the last undone action. This command is not always available.	
 Export Schematic Image	Enables you to download the current schematic to a file for additional modifications in an external application; or to choose an image format for exporting the schematic to an image file. You can import the image file to Word, PowerPoint, and other applications.	

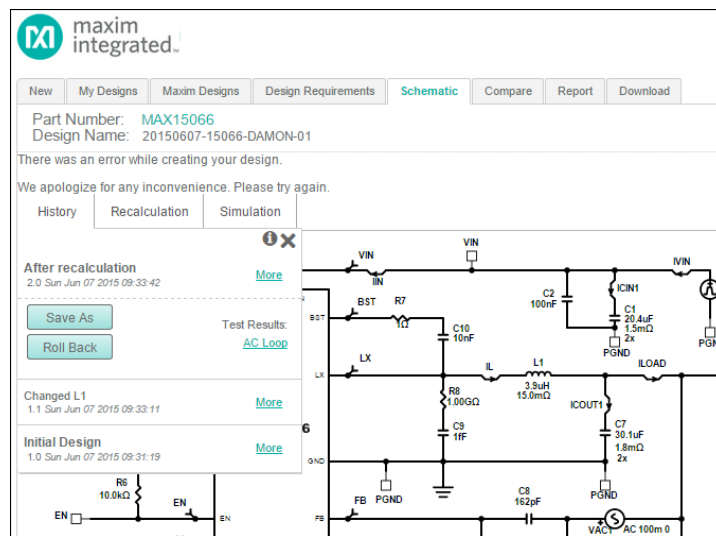
3.6.5 Version History

EE-Sim automatically stores versions of your design as you work. Changes in design requirements and recalculated schematics trigger a new major version; changes in device values are recorded as minor versions.

While you are working on your design, you can decide to go back at any time and retrieve any of these versions with all their values and simulation results preserved. When you save your design, all versions of the design are also saved with it.

NOTE: Although simulation data is not saved when you exit your design, having all versions of the design saved enables you to rerun simulations if needed. Knowing your designs are saved with such an audit trail enables you to work in EE-Sim with confidence.

1. Open a design and click the **Schematic** tab.
2. Click **History**.
3. Review the list of schematic versions. For example, from the bottom of the list to the top, you might see the following:



- a. The *Initial Design* identified by the major version 1.0 with the original creation date and time.
 - b. An entry representing a change in your schematic identified by the minor version 1.1 and showing a more recent date and time. For example, you may have changed the L1 inductor value of the component and this change was recorded as *Changed L1* and version 1.1 of the original design.
 - c. An *After Recalculation* version identified as major version 2.0 that was automatically created after you performed a Recalculation.
4. To view additional options, click **More**.
 - a. To create a new design from a previous version, select a version and then click **Save As**. This feature creates a new version 1.0 design from the selected version. Instead of using the **Save As** command, you can also open a design, click **Save**, and give the design a new name.
 - b. To restore a previous version, select a version and then click **Roll Back**. For example, in the series from 2.1 to 2.2 to 2.3, say 2.2 introduced an unwanted value into your design unknowingly carried forward into 2.3. Or, something important in 2.1 was left out of subsequent versions. In both examples, you want to go back to

version 2.1 of the design. You can roll back the design to restore the state of the design at that time.

- c. To examine the available test results associated with a previous version, click their links under **Test Results**.

NOTE: When you roll back to a previous version, all subsequent versions are lost. As a precaution, you can click **Save As** to make a backup of the latest version. Then you can roll back without concern for the lost history.

When you save a design, it is saved along with all its history but not the simulations for each step in the history. It is only while working in a single session on a design that its entire history, for that session, is available. When you save a design, no matter where it is in the history, only that specific version is saved (without the simulation data).

3.7 Export a Component or Schematic as PNG or SVG

You can export selected components, the current viewing area, or the entire schematic to a portable network graphics (PNG) file or to a scalable vector graphics (SVG) file.

1. Open a design and click the **Schematic** tab.
2. Right-click in the white space in the margin and choose one of the following menu items:
 - **Export to SVG**
 - **Export View to SVG**
 - **Export to PNG**
 - **Export View to PNG**
3. To export only a specific component, right-click a component, and choose one of the following menu items:
 - **Export Selection to PNG**
 - **Export Selection to SVG**
4. Depending on your web browser settings, the PNG or SVG file is downloaded to your local PC where you can save, view, or use the file as needed.

Tips:

When you use the zoom tools to customize the current view of the schematic and want to preserve only that specific view in the exported file, choose the **Export View to PNG** or **Export View to SVG** option.

To copy a schematic to the clipboard to paste or save as a file, see the entry for the **Copy Image to Clipboard** tool button in 3.6.4 Schematic Toolbar Reference Chart.

To download an editable file representing your schematic, see 7.4 Download a Schematic.

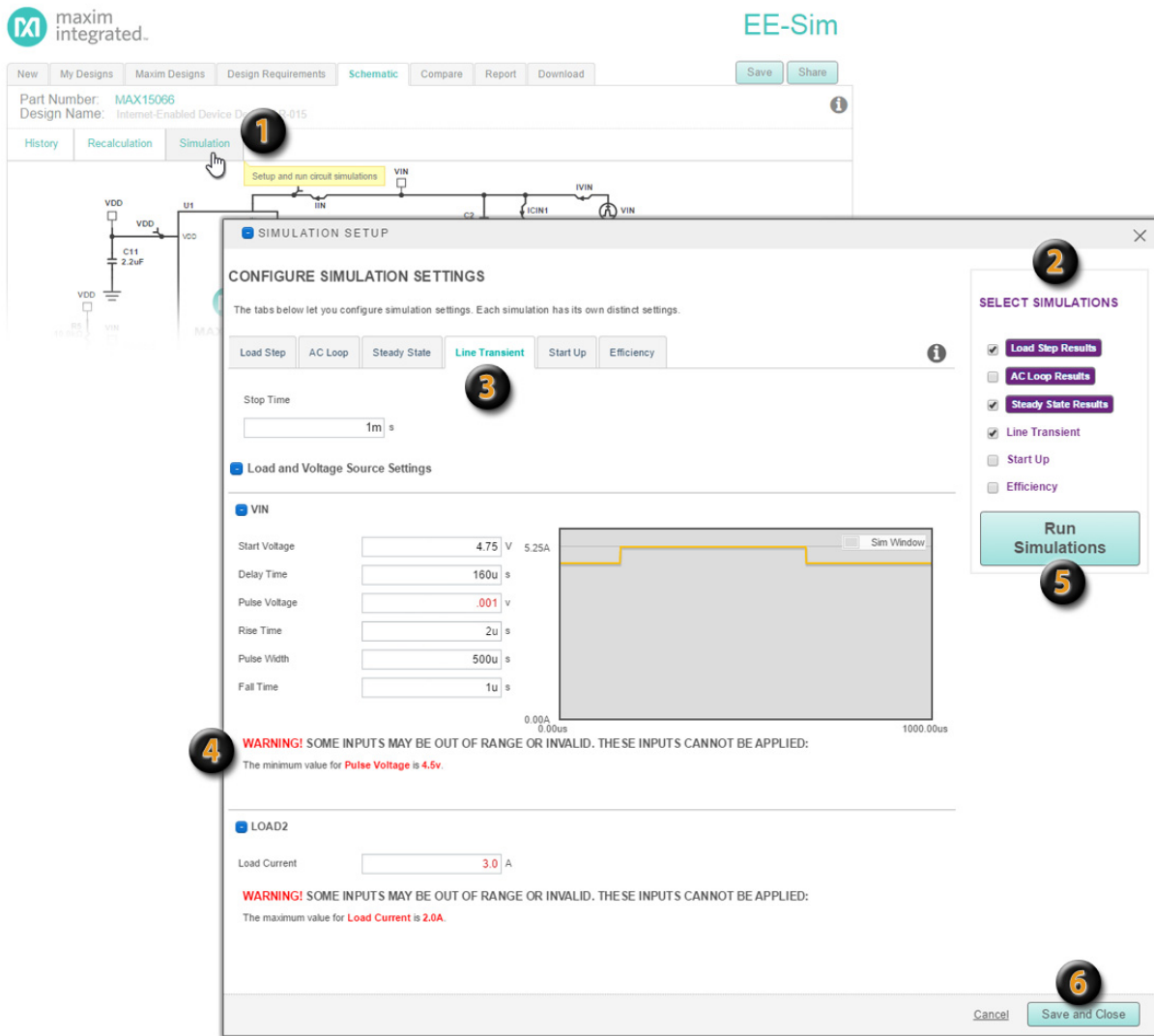
3.8 Simulation and Analysis

3.8.1 Run a Simulation and Generate Waveforms

EE-Sim provides six (6) different analysis types for you to evaluate your designs. Each type is preconfigured to provide useful waveforms; however, you can also override these settings. There is no need to learn to use the underlying simulator; EE-sim takes care of that for you.

You can run any combination of the six different simulation types. The results from each simulation type are displayed on their own separate tabs. To set up and run a simulation:

1. Open a design and click the **Schematic** tab.
2. Click **Simulation**.
3. In the **SIMULATION SETUP** window, select one or more simulation types. In the **SELECT SIMULATIONS** section on the right side of the window, check the box next to each simulation that you want to run.
4. For each simulation that you checked, select the corresponding tab to see the default values for the simulation settings. While the default settings for the simulations typically provide the results that you need, you can change them, if you choose. For example, you could:
 - a. Click **Load Step** and enter values for the simulation **Stop Time**, the Input voltage and its source resistance as well as all the load parameters. The waveform diagram represents the load step over time. The diagram is updated as you change the load parameters. The simulation time defined by the **Stop Time** field is indicated with a gray background
 - b. Click **AC Loop** and set the **Start Frequency**, **Stop Frequency**, **Input Voltage**, and **Load Current** settings for the loop Bode Plot.
 - c. Click **Steady State** and adjust the **Input Voltage** and the **Load Current**.
 - d. Click **Line Transient** and adjust the **Stop Time**, **VIN** values, and **Load Current**. The waveform diagram represents the line voltage transient over time. The diagram is updated as you change the **VIN** voltage and time parameters. The simulation time defined by the **Stop Time** field is indicated with a gray background.
 - e. Click **Start Up** and enter the simulation **Stop Time**, **Input Voltage**, and **Load Current**.
 - f. Click **Efficiency** to adjust the number of calculation Points, Input Voltage, and load Start and Stop Current settings. (Efficiency results are calculated instead of simulated.)
5. Click the **Run Simulations** button. All of the simulations that you selected are run.
6. When a test is complete, click its corresponding **Results** button to examine the waveforms in the Webscope waveform viewer.
7. You can make changes to the simulation parameters and re-run any number of simulations.
8. Click **Save and Close** when finished to save the simulation parameters.



- 1 On the Schematic page, click the **Simulation** button.
- 2 Select the check box for each simulation type that you want to run. In this example, an **AC Loop Results** button appears because we already ran this simulation. We have decided not to run it again so its check box is not checked. **Line Transient** had not been run and shows no results. We check the Line Transient box to include this simulation with the other checked simulations the next time we click **Run Simulations**.
- 3 Click a tab only if you want to customize the simulation settings.
- 4 When you edit field values, warning text appears to alert you when a setting is too low or too high. Invalid entries appear in red. These values must be corrected. You cannot run a simulation with invalid entries.
- 5 Click **Run Simulations** when you are ready to run each checked simulation.
- 6 Click **Save and Close** to save your simulation selections only for your current session. If you click Save and Close, invalid entries (in red) are not saved. The field values revert to their last valid entries.

3.8.2 View Simulation Waveforms

After you click **Run Simulations** (see previous section), each simulation type displays a custom button to show the results. For example, click **AC Loop Results** or **Load Step Results**. When you click the results button, you can expect to see the following graphs on their own separate tabs in a separate Webscope waveform viewer browser window for each test:

- **Load Step:** The many time-domain voltages and currents are grouped logically. While the groupings may vary, the most common groups are:
 - **IC:** Displays voltages of various pins on the IC that do not belong in the other groups.
 - **Input:** Displays current and voltage waveforms that are related to the input.
 - **Switching:** Displays current and voltage waveforms related to the switching transistors and nearby circuitry.
 - **Output:** Displays current and voltage waveforms that are related to the output.
- **AC Loop:** This simulation produces the simplest set of waveforms.
 - **Bode:** Displays a Bode plot of the feedback loop for each output. Frequency is plotted on the horizontal axis using a logarithmic scale. The first vertical axis is the gain in decibels (dB). A second vertical axis is phase in degrees.
- **Steady State:** The many time-domain voltages and currents are grouped logically. While the groupings may vary, the most common groups are:
 - **IC:** Displays voltages of various pins on the IC that do not belong in the other groups.
 - **Input:** Displays current and voltage waveforms that are related to the input.
 - **Switching:** Displays current and voltage waveforms related to the switching transistors and nearby circuitry.
 - **Output:** Displays current and voltage waveforms that are related to the output.
- **Line Transient:** The many time-domain voltages and currents are grouped logically. While the groupings may vary, the most common groups are:
 - **IC:** Displays voltages of various pins on the IC that do not belong in the other groups.
 - **Input:** Displays current and voltage waveforms that are related to the input.
 - **Switching:** Displays current and voltage waveforms related to the switching transistors and nearby circuitry.
 - **Output:** Displays current and voltage waveforms that are related to the output.
- **Start Up:** The many time-domain voltages and currents are grouped logically. While the groupings may vary, the most common groups are:
 - **IC:** Displays voltages of various pins on the IC that do not belong in the other groups.
 - **Input:** Displays current and voltage waveforms that are related to the input.
 - **Switching:** Displays current and voltage waveforms related to the switching transistors and nearby circuitry.
 - **Output:** Displays current and voltage waveforms that are related to the output.
- **Efficiency:**
 - **Efficiency Plot:** Displays efficiency as a percentage for a range of output current.
 - **Power Loss Plot:** Displays power loss in watts for a range of output current.

NOTE: Some parts may not utilize all six (6) analysis types.




3.8.3 Customize the Waveform Viewer Output

Use the Webscope waveform viewer to see the simulation results in a graph with table entries appearing at the bottom. The waveform viewer does a *smart autoscale* for each vertical axis. Rather than using the maximum and minimum Y values from the waveforms as the visible scale limits, it chooses slightly larger limits so that the major divisions have relatively simpler values (with fewer non-zero significant digits) and aligns the grids for multiple vertical axes. The autoscale feature improves the visual appearance of the waveforms and makes it much easier to work with them.

Refer to the following sections to customize the waveforms:

- 3.8.3.1 Customize the Waveform Tabs
- 3.8.3.2 Customize the Waveform Axes and Markers
- 3.8.3.3 Capture Precise Waveform Data Using Markers
- 3.8.3.4 Customize Your View of the Waveform Graph Using the Toolbar
- 3.8.3.5 Add a New Waveform to the Current Graph
- 3.8.3.6 Add a Custom Tab to the Waveform Simulation Results

3.8.3.1 Customize the Waveform Tabs

1. At the top of the page, click through the tabs to view the related waveforms available for each simulation.
2. To change the color of a data element in the graph, click its color-coded square in the Legend and choose another color.
3. Right-click anywhere on the graph and choose one of the following options for working with tabs:
 - a. **Edit Tab:** Allows you to specify the appearance of the current tab including its name (for example, **OUTPUT**), graph stacking method, annotation used when saving the image to the report, zoom factor (1.5 is the default ratio used when you zoom the current view in or out), and the height and width of the image saved to the report when you click  **Include in Report**,  **Copy to Clipboard** or  **Download as file** (default is 400 pixels wide by 300 pixels high).
 - Set the **Graph Stack Method** to *Not Stacked* to plot all the output in the same graph.
 - Set the **Graph Stack Method** to *Stacked* to plot each waveform on individual graphs with the graphs stacked vertically.
 - Set the **Graph Stack Method** to *Stacked for all y axes* to group the graphs by voltage (V) and Current (A).
 - b. **Add a Tab:** You can add your own custom tab. As a shortcut, click **+** on the **rightmost tab** to add a custom tab.
 - c. **Clone Tab:** You can create a new tab by duplicating an existing one and then modifying it.
 - d. **Remove Current Tab:** Removes the currently selected tab.

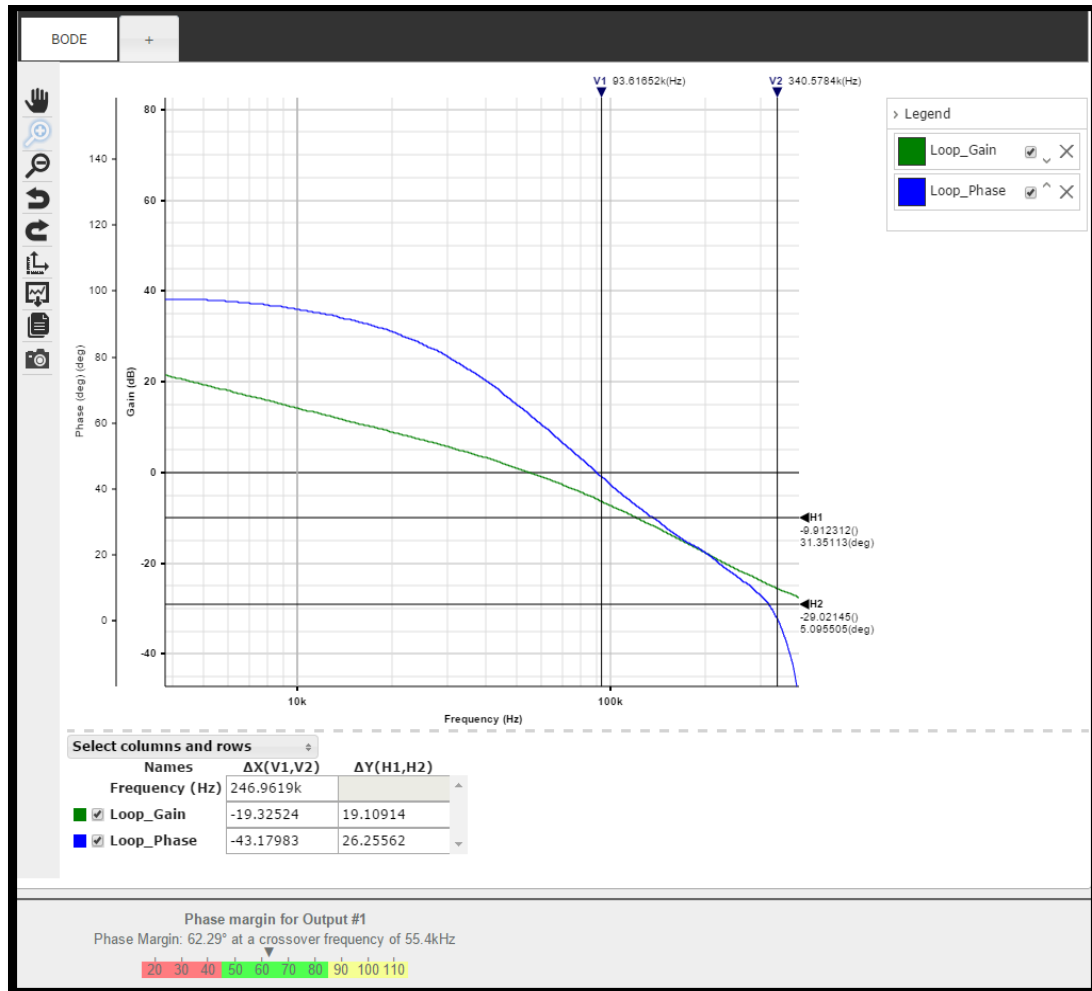
3.8.3.2 Customize the Waveform Axes and Markers

You can customize the appearance of the axes and markers.












4. **Edit Graph:** Customize the appearance of the current graph with the following options:
 - a. To specify the number of vertical markers that appear along the X-axis, enter a number between 0 and 5 in the **Number of Vertical Markers** field.
 - b. To specify the number of horizontal markers that appear along the Y-axis, enter a number between 0 and 5 in the **Number of Horizontal Markers** field.
 - c. In the **Handling of Multiple Grids** field, select the type of axis synchronization that you want to see (show all grids, show one grid, or synchronize all grids). All the initial graphs have their vertical axes synchronized. Even though the values for each gridline may be different for each axis, scales are adjusted to line up gridlines, making the visual presentation clearer.
 - d. To customize the appearance of marker names (for example H1, H2 or V1, V2) and marker values displayed adjacent to the marker handles, select an option in the **Show Marker Name** and **Show Marker Value** fields. Both fields include options to show the marker name or value always, never, or only when selected. To select a marker, grab its triangular handle in the margin (click and hold down your mouse button) and then drag and drop it.
 - e. In the **Show Border Values** field, select *On* or *Off* to show or hide the border values (i.e., the far right and far left grid lines for the X-axis and the top and bottom lines of the Y-axis). Hide border values to reduce visual clutter that can often occur in the corners of the graph.
 - f. In the **X-Axes Order** and **Y-Axes Order** fields, you can adjust the display order of the axes when more than one axis appears. Drag and drop them in sequence from top to bottom.
5. To edit an axis, right-click, select **X-Axes** or **Y-Axes**, and then choose an axis. For example, click **Voltage** to edit the appearance of voltage axis.
6. In graphs with multiple axes, the active axis appears in a bold typeface and slightly darker and thicker scale line. The active axis is used to align the values in the graph. Data points can be aligned to more than one axis. Use any of the following methods to set the active axis:
 - Click directly on the axis label.
 - Right-click, select **X-Axes** or **Y-Axes**, and then select an axis by clicking on its option button circle (sometimes called radio buttons because selecting one automatically deselects the previous one).
 - Double-click on the axis label. This option has the same result as the next option.
 - Right-click, select **X-Axes** or **Y-Axes**, and then click on an axis by name to open the **Edit Axis** dialog box. Select the **Active** check box and then click **Apply**.

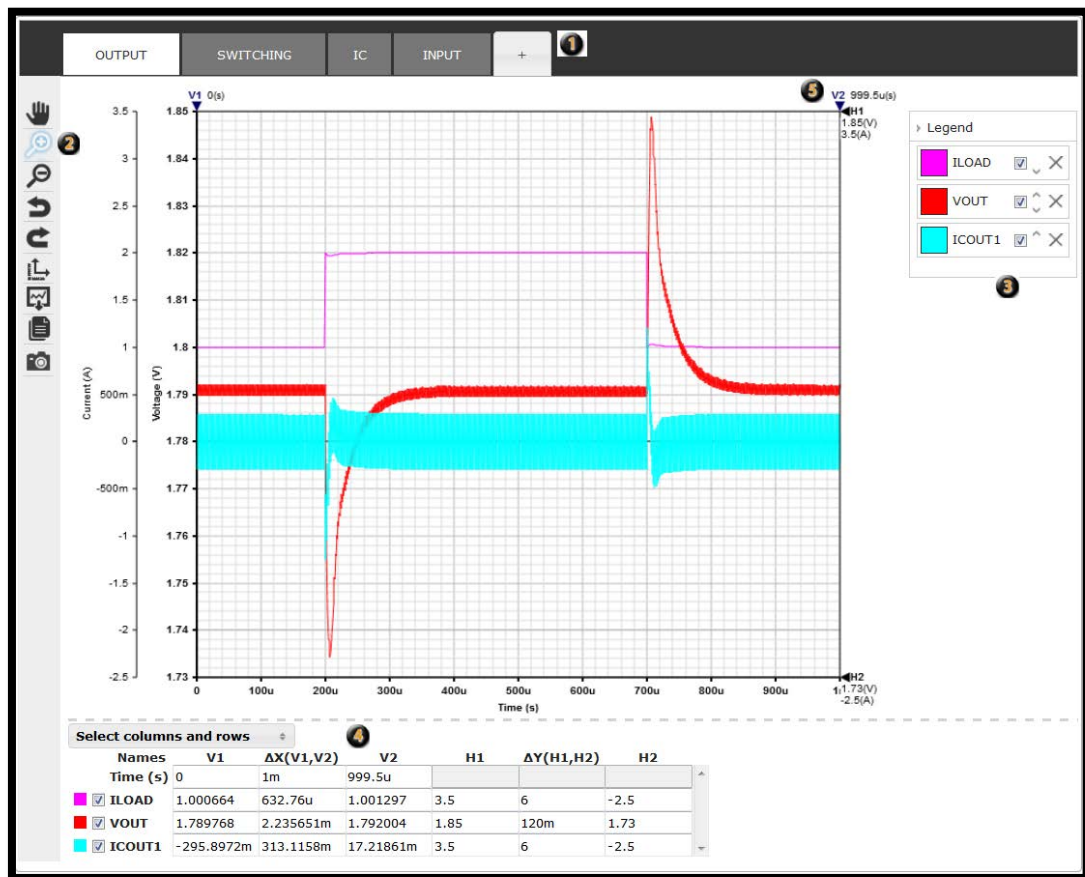
3.8.3.3 Capture Precise Waveform Data Using Markers

To adjust the vertical or horizontal markers, drag the black triangular handles in the margins of either axis. Drag and drop the axes to define a boundary around a specific portion of the graph. As you change the position of each guide marker, the vertical and horizontal marker data in the table below the graph changes. Zoom in to capture precise data points within a specific region of the graph.



3.8.3.4 Customize Your View of the Waveform Graph Using the Toolbar


1. Use the toolbar to manipulate the graph.
 - a. Click  **Pan** to navigate within the current graph.
 - b. Click  **Zoom In** to position the manual zoom tool around a specific area that you want to enlarge. Click to the left and above the item and hold down the mouse until you reach a point to the right and below the item. This defines the rectangular area to enlarge.
 - c. Click  **Zoom In** to magnify the entire graph by one zoom level per click or define a rectangular area to enlarge.
 - d. Click  **Zoom Out** to reduce the zoom level for every click.
 - e. Click  **Undo** to discard the most recent change that you made.
 - f. Click  **Redo** to re-apply a change.
 - g. Click  **Reset Zoom** to return to the original scaling and axis synchronization of the waveforms
 - h. Click  **Autoscale** to adjust the axes to maximize use of available space.
 - i. Click  **Download as file** to save the current graph as an image file on your computer. You can also download the associated data in the table. You can email or share the files with others. A **Download file** dialog box appears.
 - In the **Images** section, select an image file format.
 - In the **Data** section, to download the data in the table, select a file format. Choose **Excel** for the Microsoft Excel spreadsheet file format. You get one .xls file with separate tabs for each waveform. Choose **CSV** for comma-separated values format, popular for structuring the data for importing into a database. Choose **Text** to view the data in a plain text editor.
 - Click **Apply**. Each downloaded file appears in its own .zip archive for ease-of-use and to compress large files to a smaller size.
 - j. Click  **Copy to Clipboard** to open a preview window where you can copy the current graph to your clipboard for pasting later into another application.
 - k. Click  **Include in Report** to include the graph on the current tab in the report. To change the name of the tab, you can enter your own custom name. Insert any annotations that you want to appear with this graph in the final report, and click **Apply**. Custom graphs appear at the bottom of the design report. Expand the **Simulation Results** section on the **Report** tab to see any custom graphs. You can add as many custom graphs as you want and decide later which ones to include or exclude from the final report.
2. When finished, close the window.




- 1 Select a tab to view the corresponding waveform output.
- 2 Use the toolbar to apply the helpful commands as you work. For example, pan and zoom, undo and redo, and update the design report with the changes you make to a graph.
- 3 Use the Legend to hide and show waveforms, customize colors, and adjust the sequence.
- 4 Select the columns and rows that you want to track in the data table.
- 5 Adjust markers to calculate the changes between data points.

3.8.3.5 Add a New Waveform to the Current Graph



One way to customize your results is to add a waveform to an existing tab. .

1. Right click anywhere on the graph.
2. Click **Add a Waveform to Graph** from the menu.
3. Click the drop-down menu at the top (the triangular icon facing down  indicates you can choose from a list) and select from the list of probed voltages and currents. The rest of the items below are optional. The defaults are usually appropriate.
4. If desired, you can change the name for this waveform in the **Name** field.
5. In the **Enabled** field, select **On** to make your waveform active. Select **Off** to disable the waveform. When disabled, the waveform is listed in the legend but is hidden.
6. In the **Graph type** field, select the type of graph you want to build. Choose **Line**, **Bar**, **Point**, or **Step**.

7. Select the **Color** field to choose a specific color for this waveform. Click  **Other** to define a custom color by swatch, RGB, HSB, or hexadecimal values.
8. In the **Line width** field, select the thickness of the lines used to plot data in points or pixels.
9. Click **Apply**.

3.8.3.6 Add a Custom Tab to the Waveform Simulation Results

The previous section describes the many ways you can change the formatting of your test results. Another powerful feature is the capability to create a new custom tab to display results. Note that naming your tab is the only required input. You can accept default values for any of the other configuration choices shown below,

1. Click the **+** tab or right-click and choose **Add a Tab**.
1. In the **Name** field, enter the unique name for your new tab.
2. Set the **Chart type** to Chart.
3. In the **Number of vertical and horizontal markers** fields, enter the quantity of vertical and horizontal markers for the graph. You can drag these guide lines to capture precise data point information between the graph and the data table below it.
4. In the **Handling of multiple grids** field, the default value is **Synchronize all grids**. Choose **Show all grids** if you want to view all grids on a single graph. Choose Show one grid to limit the display of multiple grids to just one grid.
5. In the **Show marker value** field, the default selection is **When selected**. Choose **Never** to hide the display of data point values adjacent to their marker handle, choose **When selected** to display data point values only when the marker is selected, or choose **Always** to constantly display marker data values adjacent to the marker handles.
6. In the **Show marker name** field, the default value is **When selected**. Choose **Never** to hide the marker name or choose **Always** to constantly display the names of the markers adjacent to the marker handles.
7. In the **Show border values** field, the default value is **Off**. Choose **On** to show border values.
8. Click **Apply**. The **Add Waveform** dialog box appears.
9. Click the drop-down menu at the top (the triangular icon facing down  indicates you can choose from a list) and select from the list of probed voltages and currents. The rest of the items below are optional. The defaults are usually appropriate.
10. If desired, you can change the name for this waveform in the **Name** field.
11. In the **Enabled** field, select **On** to make your waveform active. Select **Off** to disable the waveform. When disabled, the waveform is listed in the legend but is hidden.
12. In the **Graph type** field, select the type of graph you want to build. Choose **Line**, **Bar**, **Point**, or **Step**.
13. Select the **Color** field to choose a specific color for this waveform. Click  **Other** to define a custom color by swatch, RGB, HSB, or hexadecimal values.
14. In the **Line width** field, select the thickness of the lines used to plot data in points or pixels.
15. Click **Apply**.

Tip: To edit the settings you just made, right-click and select **Edit Tab**, **Edit Graph** or choose **Waveforms** and select the specific waveform you want to adjust.

3.9 Compare Design Iterations

You can compare components, design requirements and simulation differences on the Compare page. As you modify your design, EE-Sim stores the major and minor versions for you. You can compare the different versions in the history to the current version.

1. Open a design and click the **Compare** tab.
2. Verify that **Show only differences** is checked. This option limits the information that appears so you can focus only on the differences between the two designs. When unchecked, all information about both designs appears.
3. Click **History**:
 - a. Select an older version that you want to compare to the newest (most recent) version.
 - b. Click **Load**.
4. Compare the changes that were made to each version line by line. The page shows the two versions side by side including design requirements, component values from the schematics, BOM information for each part and thumbnail images for the most recent simulation waveform graphs.
5. (Optional) Click a graph to open it.
6. If a simulation has been run for one version but not the other, you can click the **Run** button to generate and compare graphs.
7. To examine graphs of the same type for both designs in the WaveForm Viewer, click **Merge Graphs**. The waveforms from both versions appear with each other in a single graph with a legend that includes the design name and version.

You can also refer to the graphic on the following page when using the Compare feature.

maxim integrated.

EE-Sim

New My Designs Maxim Designs Compare Report Download Save Share

Part Number: MAX15066
Design Name: Save Design

History ☒ Show only differences

Design Requirements changed 2.0 Sat Aug 01 2015 15:19:46 Load

Loaded Maxim Design 1.0 Sat Aug 01 2015 15:19:00 Load

R5

Item	Design Requirements changed 2.0	Loaded Maxim Design 1.0
R8	1.00GΩ	1GΩ
L1	4.7uH	5.6uH
R5	10.0kΩ	10kΩ
Performance Tradeoff	Design for Small Size	Balance Efficiency and Size
Cost Tradeoff	Use Lower Cost Components	Use Higher Performance Components
R7	1.0Ω	1Ω
C2	1x C0603C104K5RACTU KEMET Corporation Cap Ceramic 0.1uF 50V X7R 10% SMD 0603 125°C Paper T/R	1x User-Defined WebSim Capacitor - 100nF
C3	1x C1206C103K5RACTU KEMET Corporation Cap Ceramic 0.01uF 50V X7R 10% SMD 1206 125°C Plastic T/R	1x C0402C103K3RACTU KEMET Corporation Cap Ceramic 0.01uF 25V X7R 10% SMD 0402 125°C Paper T/R
C5	1x C1206C103K5RACTU KEMET Corporation Cap Ceramic 0.01uF 50V X7R 10% SMD 1206 125°C Plastic T/R	1x C0402C103K3RACTU KEMET Corporation Cap Ceramic 0.01uF 25V X7R 10% SMD 0402 125°C Paper T/R
C7	2x C3225X5R1A336M200AC TDK Cap Ceramic 33uF 10V X5R 20% SMD 1210 85°C Plastic T/R	2x C4532X7R1C336M250KC TDK Cap Ceramic 33uF 16V X7R 20% SMD 1812 125°C Plastic T/R

AC Loop Merge Graphs

Run AC Loop

AC Loop Merge Graphs

- 1 When you open a design, the newest version automatically loads. You can click the **Compare** tab to view the details associated with the new version and compare them to any prior version.
- 2 Click the **History** button to view the list of versions. The latest version is already open so its Load button is grayed out. Click the **Load** button for any prior version. Tip: To reduce the volume of data in your comparison, select the Show only differences check box.
- 3 For each item in the list, compare the details for each of the two versions represented in separate columns. You can click a part number to open a product data sheet.
- 4 In this example, the AC Loop simulation has not yet been run for one of the versions. Click **Run AC Loop** to run the simulation based on the design requirements for that version.
- 5 When both graphs have been run, the **Merge Graphs** button appears as an option. Click **Merge Graphs** to combine the data from both versions into one new graph.



3.10 Generate a Design Report and BOM (DC-DC)

3.10.1 Publish a Design Report and BOM

You can generate a report that summarizes your design. You can also follow these steps to generate, view, and save a bill of materials (BOM) for the current design.

1. Open a design and click the **Report** tab.
2. A summary page appears with the following options:
 - a. Click **Product Folder**, **Data Sheet**, or **App Notes**, if shown, to view additional information about the part.
 - b. Click **Get an Evaluation Board**, if shown, to view a product evaluation kit with an overview, ordering information, design resources, data sheet, and related product links. (If no evaluation board exists for the part you have selected, the button does not appear.) You can also subscribe to alerts about the selected product.
 - c. Click **Order Samples** to search for product samples. Click the **Sample Now** button to add the samples that you want to your sample cart.
 - d. Click the **Buy** button to view product availability, quantities, and pricing.
3. For each version of your design, check or clear the **Include in report** check box.
4. To make detailed selections, expand a section and check or clear the check box to determine which of the following design details are included in your custom report:
 - a. **Design Requirements**: Expand this section to view the requirements.
 - b. **Schematic**: Expand this section to view the schematic diagram.
 - c. **BOM**: Expand this section to view the BOM.
 - In the **BOM Engine** field, choose a distributor such as Digi-Key, Avnet, or Mouser. If available, price and inventory information appears.
 - If pricing information is available, you can choose an order quantity in the **Price Break** field.
 - To change vendors and/or part numbers for a component, click on the icon to the left of the part number and the Edit Properties dialog will pop up. This is the same dialog that is used when editing a part in the schematic. Expand Part Database Properties, click Vendor Part, and then click the Select Vendor Part button to find a manufacturer and part number. Or, click **Custom**. Expand **Schematic Properties** and enter values in the **available fields**. Click **Apply** to save the custom part in the BOM for the current design.

NOTE: Editing a component here is the same as editing a part on the schematic. Some changes may cause the circuit performance to change.

- If you select Digi-Key or Mouser, you can enter your order quantity and click **Checkout** to place this BOM in the distributor's shopping cart.
 - Click  **Download** to save the BOM as a Microsoft Excel spreadsheet file.
- d. **Simulation Results**: If this section appears, expand it to view your original simulation graphs. The graphs are smaller and aligned to fit for the best viewing experience in a browser, PDF file, or printed report. Any custom graphs that were added appear with their names and annotations along with the default graphs. Check or clear the **Include in report** check box for each graph to determine whether it appears in the final report. As a shortcut, you can click a graph to open it in the design's last saved state and modify it. Click  again to re-add the changed graph to the report.

5. Scroll back up to the top of the page (or press the Home key on your keyboard). Click **Print Preview** to print the report to any printer, network copier, fax device, or to a PDF, XPS, or other file. To save the report as a PDF file, click **Download PDF**.

3.10.2 Download the BOM, Report, and Schematic

You can download your report and Bill of Materials (BOM). You can also download schematics to open or edit them in the available EE-Sim SE application for Windows. You can also open the schematics that you download in commercial versions of SIMPLIS 7.2 or later.

1. Open a design and click the **Download** tab.
2. To download the Bill of Materials (BOM), click **BOM Export**, select a file format, and click **OK**. The following formats are available:
 - a. **XLS**: Microsoft Excel spreadsheet.
 - b. **CSV**: Comma-separated values, a format that can be viewed as a spreadsheet or imported into a database.
 - c. **TXT**: Plain text with no formatting.
3. To download the most recent design report, click **Summary PDF**.
4. To download the latest schematic, click **Schematic**. You can open downloaded schematics in the offline EE-Sim SE application or in SIMPLIS version 7.2 or later
 - a. You will be given the option of having the downloaded schematic configured as it was online for any of the simulation types available. This includes automatically making the needed simulator settings. This allows you to immediately run one type of simulation successfully. You can, of course, reconfigure the downloaded schematic and simulator to perform other simulations.
5. To download EE-Sim for Windows, click **EE-Sim.exe** and follow the installation instructions on the Download page. For more information, see Chapter 7: EE-Sim SE (Offline Edition for Windows).
6. (Optional) To change or annotate the report or BOM, click the **Report** tab.
7. (Optional) To change or annotate the schematic, click the **Schematic** tab.

4 DC-DC Converter Designs V1

ALERT: A new version (V2) of the DC-DC Design Tool is in Beta test. This chapter describes original version of the tool, V1. For help with the beta version of the DC-DC Design Tool V2, please refer to Chapter 3: DC-DC Converter Designs V2 (Beta).

Part number determines whether version V1 or version V2 is used. Parts identified with a purple asterisk (*) on EE-Sim's New tab are available in V2. Parts without a purple asterisk remain in V1.

Note that "Beta" is displayed in the upper right corner of the tool instead of "DC-DC" when V2 is running.

As a registered member of the Maxim Integrated online community, you can use the Maxim EE-Sim® DC-DC Conversion tool to design, simulate, analyze, and purchase a variety of power solutions, including step-up, step-down, and isolated configurations.


EE-Sim automatically creates a circuit schematic based on your requirements, saving you precious design time and resources. Set up and complete your simulations in just minutes. You can also take advantage of the following additional features of EE-Sim:

- Share your designs with a colleague.
- Order a Bill of Materials (BOM) from your preferred distributor.
- Print a complete report.
- Download your own free version of EE-Sim.

While you are online using EE-Sim, don't forget to explore the other features and benefits of online membership with Maxim Integrated.

4.1 Creating a New Design

You can use EE-Sim to create an unlimited number of new designs. After entering your detailed input requirements, you can generate an interactive schematic with components you can modify.

1. Open your web browser and navigate to http://www.maximintegrated.com/ee_sim/.
2. **Click** Start the EE-Sim tool **or** Login if you are a returning user.
3. If you are logged in, skip ahead to the next step. If you are not logged in automatically, complete the **Member Login** page:
 - a. In the **Email Address** field, enter the email address that you used when you registered.
 - b. In the **Password** field, enter the password for your Maxim account.
 - c. Click the **Log Me In** button.
 - d. On the Login Successful page, click Start the EE-Sim tool.
4. On the **New** tab, select **DC/DC Conversion**.
5. Expand a category to view a list of Maxim products.
6. (Optional) Click  to view additional product information, including ordering details and the product data sheet.


7. Click the part number to create a new design based on that part.
8. The **Design Requirements** page appears. EE-Sim displays the part number you selected in the upper left corner. For example:
Part Number: MAX17598
Design Name: Not Saved
9. Continue to the next section for instructions on developing your design.

4.2 Specifying Input, Output, and Other Design Requirements

EE-Sim fills in default design requirements for the part you selected. Use this procedure to edit those values before generating a schematic.

1. On the Design Requirements page:
 - a. In the Input Requirements section, enter your input values in each field.
 - b. In the Output Requirements section, enter your output values in each field.
 - c. In the Design Criteria section, enter your settings in each field.
2. If available, click Show Advanced to view additional requirements. Click Hide Advanced to hide the additional requirements and simplify the current page.

Note: Even though you may choose not to view them, hidden advanced requirements are still used in the design.

3. Apply any of the following tips to save time and improve accuracy:
 - a. Press the Tab key to move to the next field.
 - b. Verify that the values you enter are in the correct field and in the required units.
 - c. In some browsers, such as Internet Explorer 10, you can click a small x to clear the value of a field.
 - d. In fields that require a limited set of acceptable values, you can enter a value using any of the following methods:
 - Click the  drop-down menu icon and choose a value.
 - Type the first digit of the closest matching value.
 - Press the Tab key to enter the field and then press the Up or Down arrow keys.
4. A message may appear when your value is not acceptable. Read the tip, click OK, and adjust the value as advised. The tool automatically inserts a suggested value.
5. (Optional) Click the Restore Defaults button to revert all fields back to their original values.
6. Continue to the next topic.

4.3 Generating a Schematic and Saving Your Design

In the two previous procedures, you selected a part and entered your design requirements. Follow these steps to generate a schematic and save your new design.

1. When all your values have been entered, click **Create Design**.
2. EE-Sim performs a complex set of calculations to design a circuit that meets your requirements. A visual representation of your design appears on the **Schematic** page. Where practical, the tool also identifies specific supporting components.
3. Click the **Save** button to save your design. In the **Save Your Design** window:
 - a. In the **Design Name** field, enter a unique name to differentiate this design from your other designs as well as the shared designs of other users.
 - b. In the **Design Description** field, enter a short description of the design to remind you later of its purpose. The description is also helpful for any recipients if you decide to share the design.
 - c. Click **Save**.

4.4 Next Steps

Congratulations! You've generated a schematic and saved your design. You can now perform one or more of the following tasks.


Task	Step	Learn More
To modify your design	Click the Design Requirements tab to change your design requirements and then click Create Design to generate a new schematic.	3.2 How to Specify Input, Output, and Other Design Requirements
To edit your schematic	Click the Schematic tab.	3.5 Modifying Schematics
To run simulations	Click the Analysis tab and enter your simulation settings.	3.6 Simulation and Analysis
To complete the design, view a summary, and download a BOM	Click the Complete Your Design tab and perform any of the available options.	3.7 Generating a Summary Page and BOM
To download one or more designs	Click the Download Designs tab and perform any of the available options.	7.4 How to Download a Schematic

Note: You are not required to visit every tabbed page in EE-Sim.

4.5 Modifying Schematics

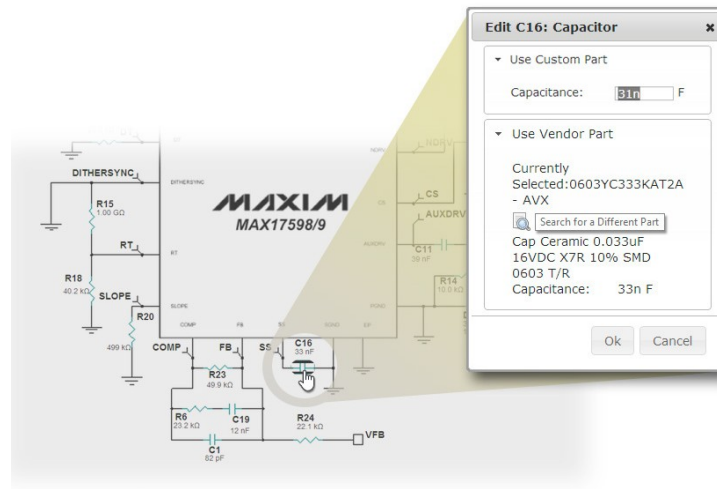
4.5.1 Modifying Product Components

You can change component settings, parts, and even switch manufacturers. You can choose stock or custom settings in a design.

1. Open a design and click the **Schematic** tab.
2. Click a component to open and edit it. In the example shown below, the **C16** capacitor is opened in the schematic diagram.
3. In the **Edit** window:
 - a. Expand **Use Vendor Part** to view the currently selected component. To switch components, click  **Search for a Different Part**. Continue with the remaining steps in this

procedure.

- b. (Optional) Expand **Use Custom Part** to enter your own setting. For example, you can change the **Capacitance** from 33 nF to 31 nF. Click **OK** and exit this procedure.
4. Apply one or more filters to search for the required manufacturers, attributes, and products. To learn more, see the example on the next page.
5. In the search results:
 - a. Click a product by its **Manufacturer Part Number** to learn more about it.
 - b. Click the **Select** icon to swap the old part for the new one.
6. Click **OK** to close the **Edit** window.



1 C16 Currently Selected: 0603YC333KAT2A - AVX Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 T/R

2 **Manufacturer Part Number**: *C333K*
 * : matches zero or more of any character.
 ? : matches any single character.
 Filter is not case sensitive.

3 **Manufacturer**: ☒ Vishay (0) ☒ TDK (0) ☒ AVX (8) ☒ Kemet (8) ☒ Murata (2)

4 **Packaging**: ☐ Bulk (4) ☐ Cut Tape (CT) (14) ☒ Reel (21) ☒ Tape and Reel (74)

5 **Tolerance**: ☒ 10 % (5) ☒ 10% (13)

Capacitance: 4.47uF, 3.89nF

Voltage Rating: 64.0V, 16.0V

Oper: ☐ -55 ☐ -55* ☐ -55C

APPLY FILTERS Filters: Clear All | Reset | Hide Applied

Applied Filters

Manufacturer Part Number	Manufacturer	Packaging	Tolerance	Capacitance	Voltage Rating	Package / Case	Temperature Coefficient	Mounting
C333K	Vishay AVX Kemet Murata TDK	Reel Tape and Reel	10 % 10%	3.89n to 4.47u	16 to 64	0603 0603 (1608 Metric)	X7R	Surface Mount Surface Mount, MLCC

Select	Manufacturer Part Number	Manufacturer	Description	Packaging
<input checked="" type="checkbox"/>	0603YC333KAT2A	AVX	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 T/R	Tape and Reel
<input checked="" type="checkbox"/>	0603YC333KAT4A	AVX	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 T/R	Tape and Reel
<input checked="" type="checkbox"/>	C0603C333K4RAC7411	Kemet	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel
<input checked="" type="checkbox"/>	C0603C333K4RACAU0	Kemet	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 T/R	Tape and Reel
<input checked="" type="checkbox"/>	C0603C333K4RACTM	Kemet	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel
<input checked="" type="checkbox"/>	C0603C333K4RACTU	Kemet	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel
<input checked="" type="checkbox"/>	GRM188R71C333KA01D	Murata	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel
<input checked="" type="checkbox"/>	GRM188R71C333KA01J	Murata	Cap Ceramic 0.033uF 16VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel
<input checked="" type="checkbox"/>	0603C333KAT2A	AVX	Cap Ceramic 0.033uF 50VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel
<input checked="" type="checkbox"/>	C0603C333KSRAC7U	Kemet	Cap Ceramic 0.033uF 50VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel
<input checked="" type="checkbox"/>	C0603C333KSRALTU	Kemet	Cap Ceramic 0.033uF 50VDC X7R 10% SMD 0603 Paper T/R	Tape and Reel

- 1 Selected Part:** The top of the window shows the original part you selected in the schematic.
- 2 Available Filters:** This section lists your search options. Default settings are based on the design requirements that you entered for your design before generating the schematic. Make adjustments to find only the parts of interest to you.
- 3 Filter Controls:** Scroll from left to right to view all available filter options. Click **Hide Applied** to hide filter criteria from the page in order to view more search results. Click **Reset** to restore default values and **Clear All** to remove all values. Click the **Apply Filters** button to begin your search for products that match your search criteria.
- 4 Applied Filters:** This section reminds you of the search criteria that were used to generate the list of matching parts.
- 5 Search Results:** Click a part number to learn more about the product and manufacturer. Click **Select** to replace the original part with a new one. Your changes are reflected immediately in the schematic.

4.6 Simulation and Analysis

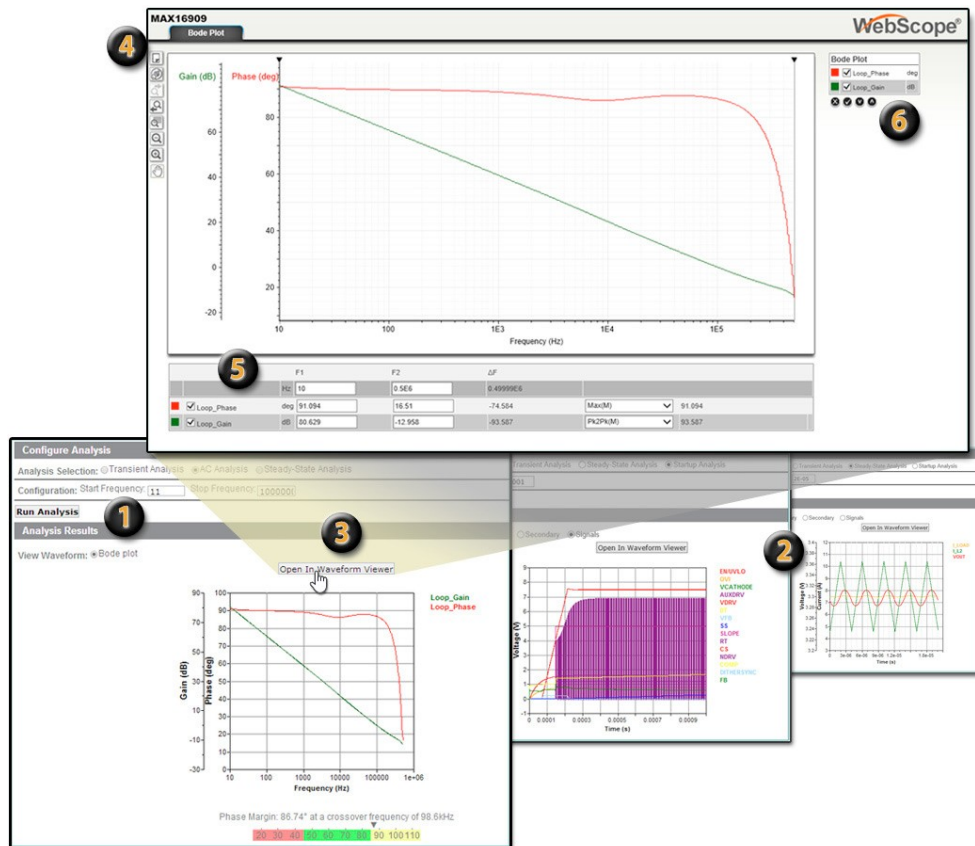
4.6.1 Running a Simulation and Generating Waveforms

You can use EE-Sim to run an analysis to generate waveforms.

1. Open a design and click the **Analysis** tab.
2. In the **Configure Analysis** section, select an option for the **Analysis Selection** field:
 - a. Click **AC Analysis** and enter a **Start Frequency** and **Stop Frequency**.
 - b. Click **Transient Analysis** and enter a **Simulation Stop Time**.
 - c. Click **Steady-State Analysis** and enter a **Simulation Stop Time**.
 - d. Click **Startup Analysis** and enter a **Simulation Stop Time**.

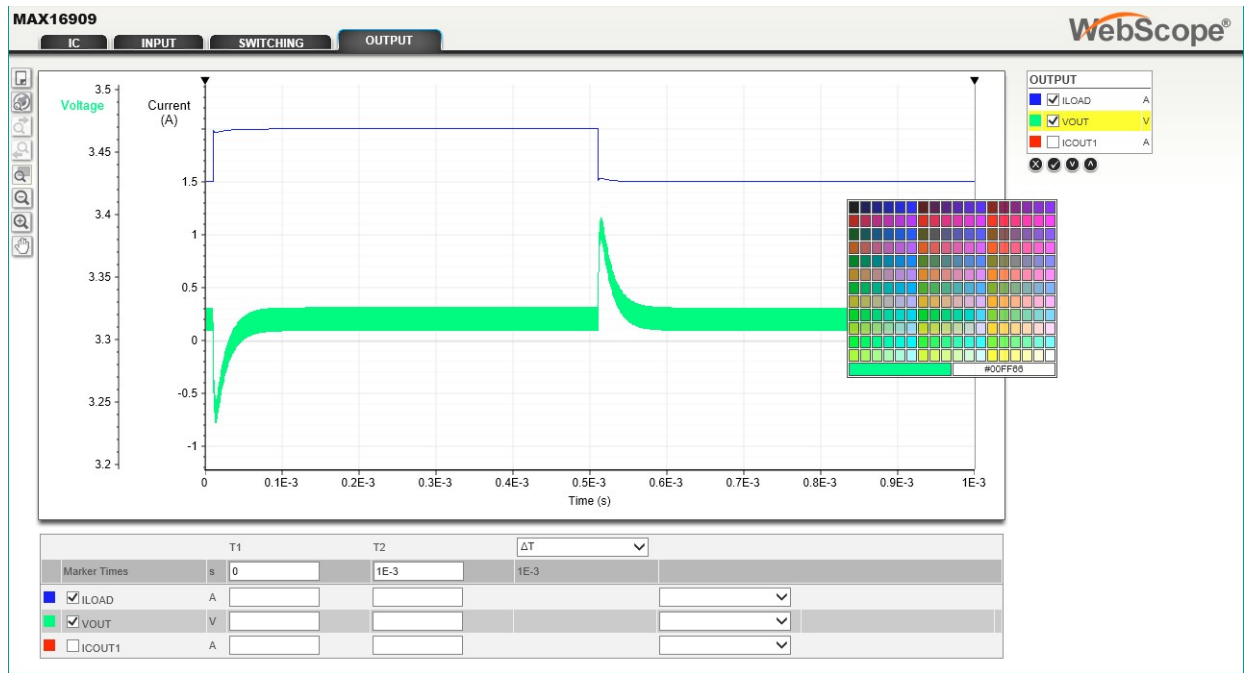
Note: The parameters vary based on the design. Field labels may also appear as Startup and Stop Time.

3. Click the Run **Analysis** button.



- 1 Run Analysis:** Select an analysis type and enter your **Configuration** settings. Click **Run Analysis** to generate a default waveform.
- 2 Waveforms:** EE-Sim offers you several different types of simulation results including Bode plot, IC, Input, Switching, Output, Primary, Secondary, and Signals.
- 3 Waveform Viewer:** Click the **Open in Waveform Viewer** button or click the waveform graph to open the WebScope waveform viewer in a separate window. You can click the tabs available in the viewer to generate and manipulate the plotted results. The tabs correspond to the available waveforms for your design and selected type of analysis. For example, click **Bode Plot**, **Secondary**, or **Signals**.
- 4 Toolbar:** Toolbar buttons allow you to zoom in and out, pan, and print your waveforms. Position your mouse over each toolbar icon to view its function.
- 5 Configuration Data:** You can edit the configuration data to update the waveform. For example, adjust the start time, stop time, or change (delta) in time. You can also indicate Min, Max, RMS, Pk2Pk, Slope, or Avg electrical values and turn on (check) or off (uncheck) colorized markers in the plotted area.
- 6 Chart Legend:** Show, hide, and adjust the sequence of the plotted current (A) and voltage (V) values. Click a color square to select a new color from the pop-up color selection switch. You can also turn on (check) or off (uncheck) a color-coded series of values in the waveform.

The following image shows another example of the waveform viewer. In this example, the ICOUT 1 values in the **Output** view are turned off. The color selection pop-up appears because we clicked the VOUT green square icon to change it to another color.



4.7 Generating Summary Page and BOM

4.7.1 Generating and Printing a Summary Page

You can generate a summary page for your design.


1. Open a design and click the **Complete Your Design** tab.
2. A summary page appears. Click any of the available options:
 - a. Click **Evaluation Board** to view a product evaluation kit with ordering information, samples, design resources, an overview, data sheet, and related product links. (If no evaluation board exists for the part you have selected, the button will not appear.) You can also subscribe to alerts about the selected product.
 - b. Click **Order Samples** to search for product samples. Click the **Sample Now** button to add the samples that you want to your sample cart.
 - c. Click the **Buy** button to view product availability, quantities, and pricing. Click **Quote Now** for a price quote or **Buy Now** to make a purchase.
 - d. Click **Quick View**, **Data Sheet**, or **App Notes**, if shown, to view additional information about the part.
3. Click **Print Page** to print the page to a printer, network copier, fax device, or to a PDF, XPS, or other file.

Note: If the **Simulation Results** section of the Complete Your Design summary page displays the following message, it means you have not yet clicked **Run Analysis** on the **Analysis** tab:

Results will be shown here after a simulation has been run.

4.7.2 Generating and Saving a BOM

Use this procedure to generate, view, and save a bill of materials (BOM) for the current design.

1. Open a design and click the **Complete Your Design** tab.
2. Scroll down to the **Bill of Materials** section.
3. In the **BOM Engine** field, choose a distributor such as Digi-Key, Avnet, or Mouser. You can also choose Generic. If available, price and inventory information appears.
4. (Optional) If pricing information is available, choose an order quantity in the **Price Break** field.
5. (Optional) If you select *Digi-Key*, you can enter your order quantity and click **Checkout** to place this BOM in a shopping cart on the Digi-Key website.
6. Click  **Download** to save the BOM as a Microsoft Excel spreadsheet

5 System Power Designs

As a registered member of the Maxim Integrated online community, you can use the Maxim EE-Sim® System Power tool to view custom DC-DC and sequencer recommendations for multi-rail or multi-load systems including processor, SoC, uC, and FPGA designs.

EE-Sim automatically validates your part selections based on your requirements, saving you precious design time and resources. You can also take advantage of the following additional features of EE-Sim:

- Share your designs with a colleague.
- Order a BOM from one or more distributors.
- Design and simulate individual integrated circuits (ICs).
- Choose power sequencer ICs and view timing.
- Print a complete report.

And while you are online using EE-Sim, don't forget to explore the other features and benefits of online membership with Maxim Integrated.

5.1 Create a New System Power Processor Design

You can use EE-Sim to create a new processor design and explore the components required to power it. After entering your detailed input requirements, you can generate an interactive schematic with components you can modify.

5.1.1 Create a New FPGA Processor Design and Schematic

Use this procedure to create a new processor design with a **Device Type** setting of *FPGA*.

1. Click the **New** tab and select **SYSTEM POWER**.
2. Click **Open System Power Tool**.
3. On the **Design Requirements** page, in the **Device Selection** section:
 - a. In the **Device Type** field, select *FPGA*.

NOTE: The fields and acceptable values on the **Design Requirements** page automatically change based on the value you choose in the **Device Type** field.

- b. In the **Manufacturer** field, choose Xilinx or Altera.
 - c. In the **Family** field, choose the product family or series available from the manufacturer that you selected in the previous step.
 - d. In the **Device** field, choose a specific model number. The list of available devices corresponds to the product series that you selected in the Family field.
4. (Optional) You can click **Save** now to name your design, assign a short description, and click **Save** again. Or, you can continue developing your design and save it later.
 5. In the **Power Requirements** section, the **FPGA Power Estimator File** option is automatically selected for you when you choose *FPGA* in the **Device Type** field in the previous section.

NOTE: If you change the **Device Type**, your original values are removed.

6. Click **Browse**.
7. In the **Choose File to Upload** window, navigate to your Altera or Xilinx power estimator file in a folder or on your computer. Select the file and click **Open**.
8. Click **Upload**.
9. Click **Preview Device** to view the rails and pins for your device.
 - a. Any missing values in the table appear with a red border to alert you to finish entering your design requirements.
 - b. (Optional) You can combine loads with the same voltage requirement by assigning the same Group Number to them. Two or more rows with a shared group number will be treated as a single rail.
10. Examine the preview image and, if necessary, adjust any values.
11. In the **DC Input Requirement** section, adjust the default voltage in the **Supply Voltage** field.
12. Click **Create Design**.
13. Click **Save** to save your changes.

5.1.2 Create a New Processor/SoC/Custom Load Design and Schematic

Use this procedure to create a new processor design with a **Device Type** setting of *Processor/SoC/Custom Load*.

1. Click the **New** tab and select **SYSTEM POWER**.
2. Click **Open System Power Tool**.
3. On the **Design Requirements** page, in the **Device Selection** section:
 - a. In the **Device Type** field, select *Processor/SoC/Custom Load*.

NOTE: The fields and acceptable values on the **Design Requirements** page automatically change based on the value you choose in the **Device Type** field.

- b. In the **Manufacturer** field, enter a manufacturer.
 - c. In the **Family** field, enter a product family for your choice of manufacturer.
 - d. In the **Device** field, enter a model number or product identifier.
4. (Optional) You can click **Save** now to name your design, assign a short description, and click **Save** again. Or, you can continue developing your design and save it later.
5. In the **Power Requirements** section, the **Processor/Custom Load** option is selected when you choose the *Processor/SoC/Custom Load* value in the **Device Type** field.

NOTE: If you change the **Device Type**, your original values are removed.

6. Complete one or more rows in the power requirements table:
 - a. In the **Pin Name** field, enter the unique identifier for each pin (for example, VCCO).
 - b. In the **Group** field, enter an integer number. To combine rails with the same voltage, enter the same group number for those rails.
 - c. In the **Voltage (V)** field, enter the voltage.
 - d. In the **Ireq (A)** field, enter the amperage.
 - e. In the **Supply Tolerance** field, adjust the tolerance threshold if you require a value greater than or less than the default value of plus or minus 2.5 percent.
 - f. To delete a row, click **Delete**.
 - g. To add settings for a new pin, click **+ Add Row**.
7. Click **Preview Device** to view the rails and pins for your device.
 - a. Any missing values in the table appear with a red border to alert you to finish entering your design requirements.

- b. Correct the conflicting voltage values if you assigned a shared group number to rows with different voltages. Enter the same voltage for each row in the group.
8. Examine the preview image and, if necessary, adjust any values.
9. In the **DC Input Requirement** section, adjust the default voltage in the **Supply Voltage** field.
10. Click **Create Design**.
11. Click **Save** to save your changes.

5.2 Next Steps

Congratulations. You generated a schematic and saved your design. As a summary, you can now perform one or more of the following tasks:

Task:	Step:	Learn More:
To edit your design:	Click the Design Requirements tab.	4.1 Create a New System Power Processor Design
To edit your schematic:	Click the View Schematic tab.	4.3 Modifying System Power Schematics
To configure sequencing and group/rail assignments:	Click the Sequencing tab.	4.4 Sequencing
To complete the design, view a summary, and download a BOM:	Click the Summary tab.	4.5 Generate a Summary Page and BOM (System Power)
To download designs:	Click the Download Designs tab.	7.4 Download a Schematic

5.3 Modifying System Power Schematics

5.3.1 Add and Connect Product Components

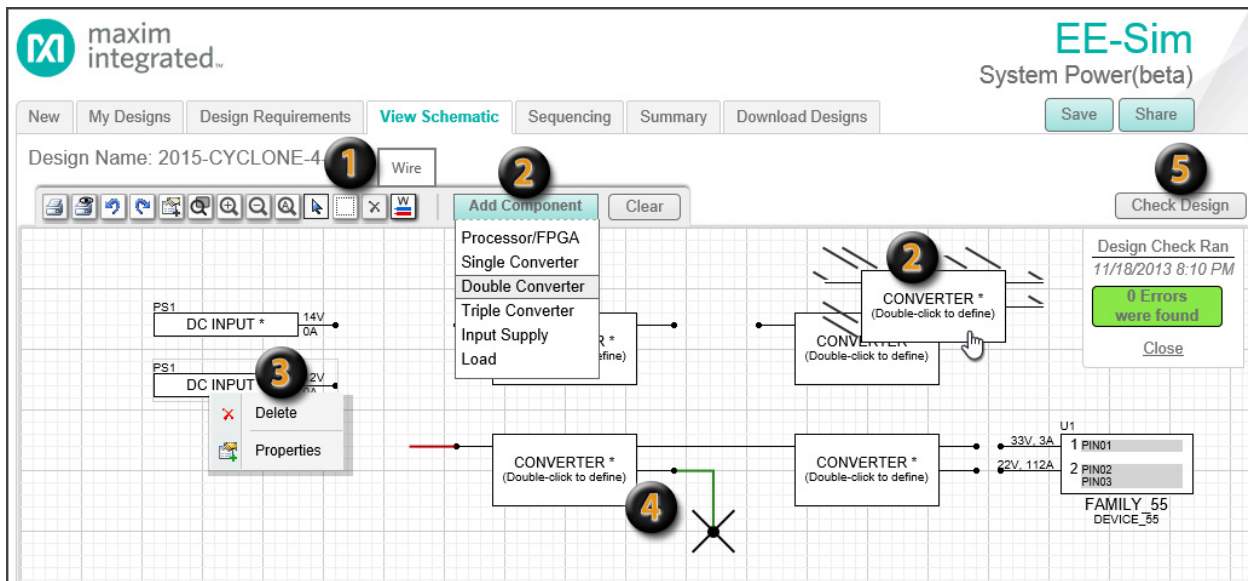
You can add, connect, and change components directly in the schematic.

1. Open a system power design and click the **View Schematic** tab.
2. To add a component, click **Add Component** and choose a component from the menu. You can select converters, an input power supply, an additional load, or another processor.
3. Move the component to a specific location and click in the grid to position it there.
4. To connect components, drag circuit connection lines by their points and release your mouse button at the end point or to make a 90-degree turn in the line.

NOTE: To correct a mistake, click the **Undo** icon in the toolbar. To remove unwanted objects, use the **Marquee Select** tool to draw a box around them using your mouse and click the **Delete** icon to delete all objects in the marquee box.

5. Refer to the examples described in the following graphic to complete any additional tasks. For example, you can print, zoom, add wire, and check a design for errors.
6. Click **Save**.
7. (Optional) When you make an active choice to click **Check Design** or a passive choice to navigate away from the **View Schematic** page, EE-Sim validates the following design rules:
 - The voltages on a given connection match.
 - The required current is less than the supplied current.

- The power out is equal to 80% of input power.
- Loads do not have multiple sources.



- 1 Toolbar:** The top of the window shows a toolbar you can use to access tool buttons for familiar commands. You will recognize icons for the print, undo, redo, zoom, select, delete, and wire commands. To refresh your memory, position your mouse over an icon to view its functional name in a tooltip.
- 2 Add Component:** When you click this button, a menu appears. Choose a component. Slowly move your mouse down to position the new component in the grid.
- 3 Right-Click Menu:** Instead of clicking a component first and then clicking the Delete toolbar button, you can right-click the component and choose Delete from a shortcut menu. Instead of double-clicking a component to view its properties, you can right-click and choose Properties.
- 4 Connection Wires:** When you position your mouse over a connection point, it changes to the X-shaped wire cursor. You can connect a new green line to another line or point. Red lines represent incomplete connections. Complete connections appear as straight line segments or 90-degree connected line segments with no points.
- 5 Check Design:** Click **Check Design** to determine if the converters are properly sized for the loads they are supporting. When you navigate away from the **View Schematic** page, EE-Sim automatically checks your design and reports any validation errors.

5.3.2 Select a Component

You can select and change components directly in the schematic.

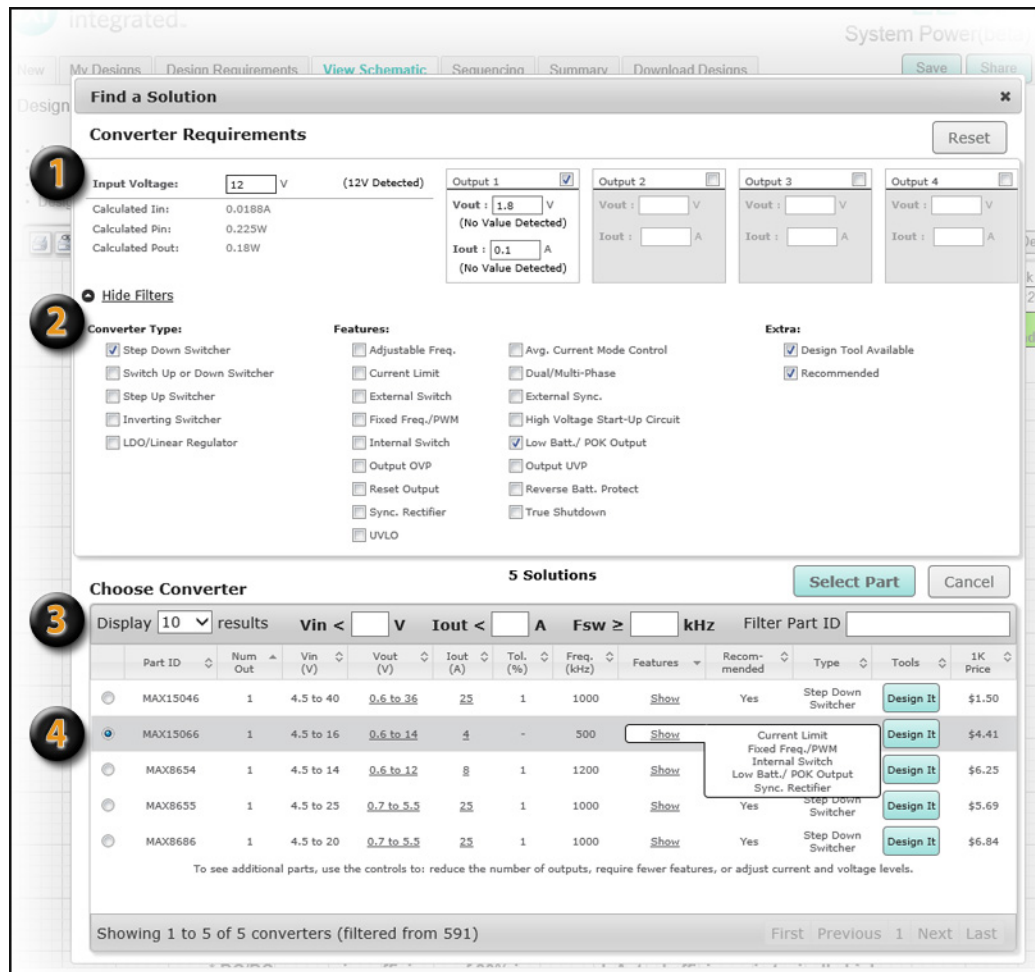
1. Open a system power design and click the **View Schematic** tab.
2. Double-click a component. The resulting window varies for each type of component.
 - a. **Input Supply:** In the **Define Source Supply** window, verify or change the **Supply Voltage** field and then click **Ok**.
 - b. **Processor/FPGA:** In the **Choose/Configure Processor/FPGA** window, verify, change, or define the power requirements of each pin. Click **+ Add Row** to add a new row to the table. To learn more about creating a new processor in this design,

refer back to *4.1.1 Create a New FPGA Processor Design and Schematic*. When finished, click **Ok**.

- c. **Load:** In the **Configure Load** window, complete the **Name**, **Required Voltage** (Volts), **Voltage Tolerance** (%), and **Required Current** (Amps) fields. Click **OK**.
- d. **Converter:** In the **Find a Solution** window, verify or change the **Converter Requirements**, apply one or more filters, and then choose a converter. Click **Select Part** to use the highlighted part in your schematic. If the part is available in the EE-Sim DC-DC Converters tool, click the **Design It** button to add the converter to your schematic and then automatically design and simulate it. Refer to the following example.

NOTE: When you double-click a converter with the Design It! feature, the Design Decision window appears. You can click **Design It** to design the component or you can click **Reselect** to choose a different part. If you click **Design It**, the EE-Sim DC-DC Converters tool appears in a window. See the chapter on [DC-DC Converter Designs](#) for instructions.

3. Complete any additional tasks. For example, you can print, zoom, add wire, and check a design for errors.
4. Click **Save**.



- 1 Converter Requirements:** Verify the detected voltage and current values are correct. You can also modify detected values, or manually add or delete rails. Click **Reset** to erase all custom values on the entire page and start over.
- 2 Apply Filters:** Click Show Filters and check the filter criteria you want to apply to narrow down the search results. Check **Design Tool Available** to find solutions that feature the EE-Sim DC-DC Converter tool. Click **Hide Filters** to stop showing the filter criteria and simplify the appearance of the page.

- 3 Display Options and Final Selection Filters:** Choose a value in the **Display results** field to determine your preferences for paging and scrolling. For example, choose *All* to view all results in one long scrolling list instead of page by page with 10 results per page. If too many solutions appear, apply specific input voltage, output current, and switching frequency filters at the top of the table. If too few solutions appear, try relaxing your filter criteria. You can also filter on a part ID.
- 4 Select a Part:** You may need to scroll or navigate to view all the matching solutions for your filter criteria. Position your mouse over the **Show** link in the **Features** column to view a summary of the key features for this device. The list includes features that match your filter criteria as well as any other features to help you make an informed decision. Click on the circular radio control for your chosen part and then click the **Select Part** button to use it in your schematic.

5.4 Sequencing

5.4.1 Add a Sequencer

Typically, your design should include at least one sequencer to manage the flow of power to the rails in the prescribed order.

1. Open a system power design and click the **Sequencing** tab.
2. Click the **Add Sequencer** button.
3. In the **Find a Solution** window:
 - a. Click **Show Filters** (it may already be displayed).
 - b. In the **Input Channels** section, enter values for the Min and Max number of input channels.
 - c. In the **Voltage Input** section, enter a value for the Max voltage.
 - d. In the **Interface**, **Option**, and **Features** sections, check the filter criteria that you want to apply to narrow the search results for your sequencer.
 - e. In the **Choose Sequencer** section, scroll or navigate to the pages that show matching parts. You can also click a column heading to sort or enter a search phrase to find specific matching sequencers.
4. Select a sequencer in the list and then click **Select Part**.
5. On the **Sequencing** page in the **Sequencer Selection** section:
 - a. Verify your sequencer appears and the number of input channels is acceptable.
 - b. To change parts, click **Edit**.
 - c. To delete this sequencer, click **Delete**.
 - d. To add another sequencer, click **Add Sequencer** and repeat the steps in this procedure.
 - e. To indicate that you want EE-Sim to produce a timing diagram to help you verify the timings, check the box for **Check for Timing View**.
6. Click **Save**.

5.4.2 Edit the Group/Rail Assignments and View the Timing Diagrams

Perform these steps to edit the group/rail assignments and generate timing diagrams.

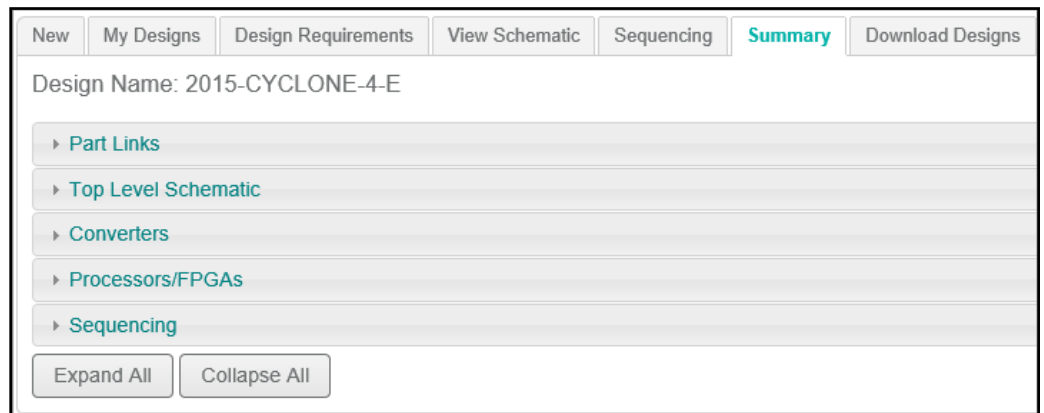
1. Open a system power design and click the **Sequencing** tab.
2. Verify that you have added at least one sequencer.
3. Expand the **Group/Rail Assignment** section. The color-coded FPGA Groups and Rail(s) data appear only when you have added at least one sequencer.

4. For each FPGA Group and rail or pin:
 - a. Choose a sequencer reference designation from the **Sequencer** field.
 - b. Enter a **Delay On** value in milliseconds. This is the delay from t=0 seconds before power is applied to the rail.
 - c. Enter a **Delay Off** value in milliseconds. This is the delay from t=0 seconds before power is terminated to the rail.
5. Click **Apply Changes**.
6. Expand the **Timing Diagram** section and examine the **Delay On** and **Delay Off** graphs.
7. (Optional) Position your mouse over a data point in the graph to view its FPGA group, voltage out, and delay in milliseconds.
8. Click **Save**.

5.5 Generate a Summary Page and BOM (System Power)

5.5.1 Explore the System Power Tool Summary Page

1. Open a system power design and click the **Summary** tab.
2. Scroll down to the bottom of the **Summary** page and click **Collapse All**. The page shows the five sections of the **Summary** page:



3. Click **Part Links** to expand this section and view the following data:
 - a. **Ref Des:** The abbreviated name or ID for the part as it is referenced in the design schematic. For example, item PS1 represents a power supply and item U1 represents a processor.
 - b. **Part Number:** The OEM part number, model name, or generic item name such as *Power Supply*.
 - c. **Device Type:** The category for the part, such as *Processor/FPGA*, *Sequencer*, or *Supply*.
 - d. Click **Data Sheet** to view a multi-page PDF document with complete part specifications, commands, and other reference information.
 - e. Click **Info** to view additional online information about the part.
4. Click **Top Level Schematic** to expand this section and view the diagram in read-only mode. To edit the schematic again, click **View Schematic**.

5. Click **Converters** to view the requirements for each converter used in your schematic. If the converter was designed and simulated in the EE-Sim DC-DC Converters tool, those results are shown here (BOM, schematic, waveforms, etc.)
6. Click **Processors/FPGAs** to expand this section. Click a processor to expand it. Your specifications from the original **Design Requirements** page appear in a read-only view that includes the manufacturer, model or family, device number, pin names, pin groups, voltages, amperes, and supply tolerances.
7. Click **Sequencing** to expand this section and reveal three subsections:
 - a. Click **Sequencer Selection** to view any sequencers chosen.
 - b. Click **Group/Rail Assignment** to view these assignments.
 - c. Click **Timing Diagram** to view the timing diagrams for this device.
 - d. To make any changes, click the **Sequencing** tab.
8. Click **Save** to save the final version of your design.

5.5.2 Generate and Print a Summary Page

You can view a web page or PDF that summarizes your design in the following five sections:

- Part Links
 - Level Schematic
 - Converters
 - Processors/FPGAs
 - Sequencing
1. Open a system power design.
 2. For a summary page in HTML format:
 - a. Click the **Summary** tab.
 - b. Scroll down to the bottom of the **Summary** page and click **Expand All**.
 - c. The **Summary** page appears showing all five sections in your web browser.
 3. For a summary page in PDF format:
 - a. Click the **Download Designs** tab.
 - b. Click **Download PDF** to view, open, or save the **Summary** page with all five sections in a PDF file.
 4. From your web browser or the PDF file, click **Print** to print the summary to a printer, network copier, fax device, or to save the file as a PDF, XPS, or other format.

5.5.3 Generate and Save a BOM

Use this procedure to generate, view, and save a bill of materials (BOM) for a system power design.

1. Open a system power design and click the **Download Designs** tab.
2. Click **Download BOM**.
3. Open or save the BOM as a Microsoft Excel spreadsheet file with the following columns:
 - Reference ID (matching the item identifiers used in the schematic)
 - Quantity
 - Part Number
 - Manufacturer
 - Description

6 Filter Designs

Documentation for this section is not yet available.

7 PLL/VCO Designs

Documentation for this section is not yet available.

8 EE-Sim SE (Offline Edition for Windows)

The EE-Sim Simulation Engines (SE) are available as a complementary download for EE-Sim users. You can perform any of the following tasks with EE-Sim SE, the offline edition of EE-Sim:

- Simulate your circuit.
- Perform enhanced schematic editing, waveform viewing, and analysis.
- Use the SIMPLIS simulation engine for switching power supply applications.
- Run the SIMetrix Spice simulation engine.

8.1 Download EE-Sim SE

You can download EE-Sim SE for offline use on a PC running Microsoft Windows® 10, Windows 8.1, Windows 7, Windows Vista, XP, 2000, or NT 4 with SP6.

NOTE: EE-Sim SE software will not install or run on Windows 95, 98, or ME.

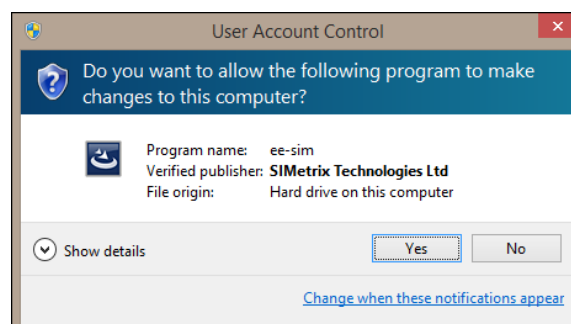
1. Navigate to www.maximintegrated.com and start the online edition of EE-Sim. See the first chapter of this guide if you need assistance.
2. Click the **Download** tab.
3. Click the **EE-Sim.exe** link.
4. Save the installation file to your desktop or temporary downloads folder.
5. Exit all other applications.
6. Continue to the next procedure to run the installer.

NOTE: After installing EE-Sim SE, you can safely delete the installation file.

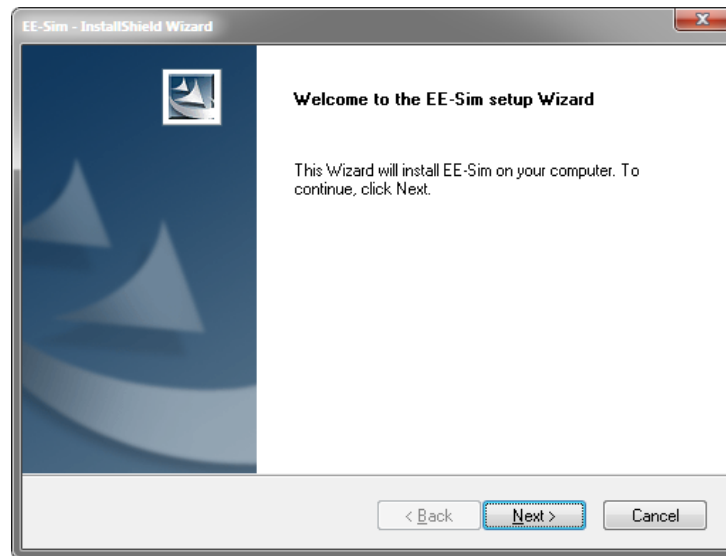
8.2 Install EE-Sim SE

The EE-Sim installer follows the same application standards that apply to all Windows software programs.

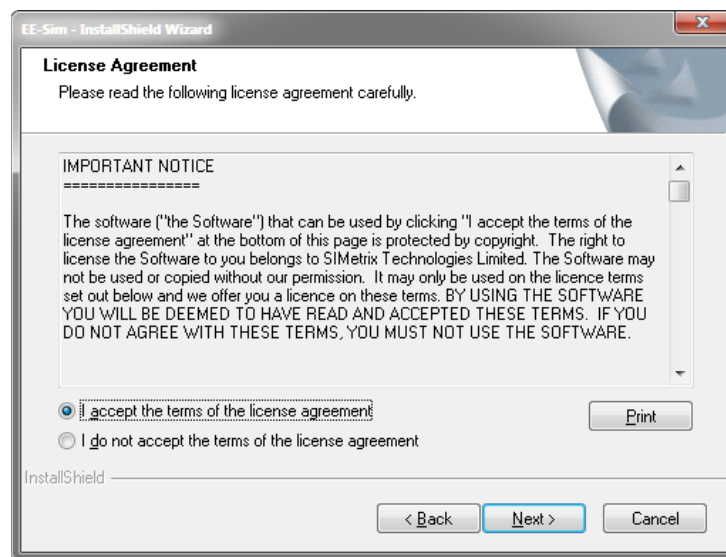
1. Open the EE-Sim installer application. For example, click **ee-sim-xx.exe**.
2. If the **User Account Control** window appears, click **Yes**. The software has a valid security certificate.



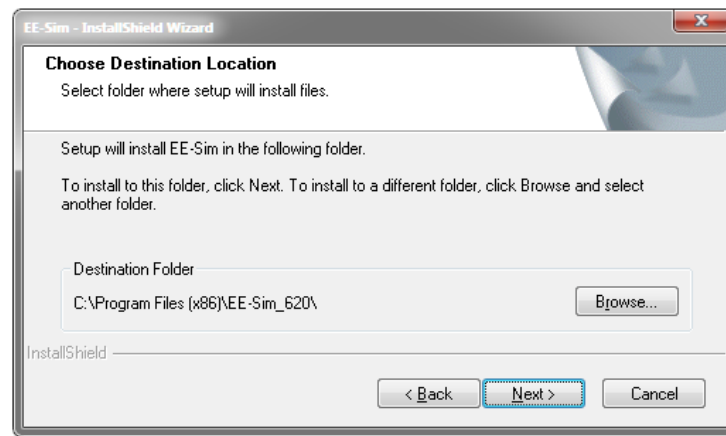
3. The installation wizard appears to guide you through a series of installation options spanning multiple pages. Click **Next**.



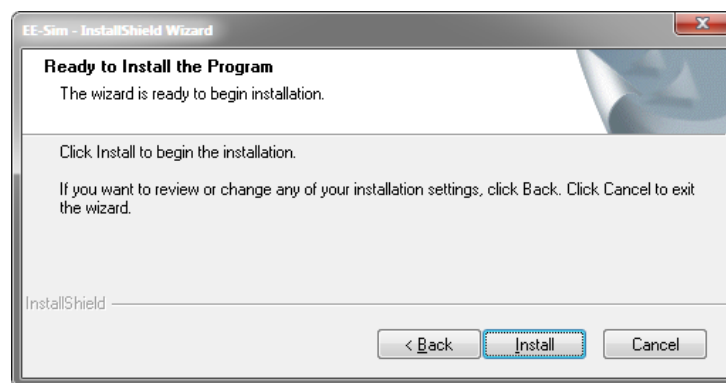
4. In the **License Agreement** window, scroll down to read the terms and click **I accept the terms of the license agreement**. Click **Print** to save a copy of the terms. To continue, click **Next**.



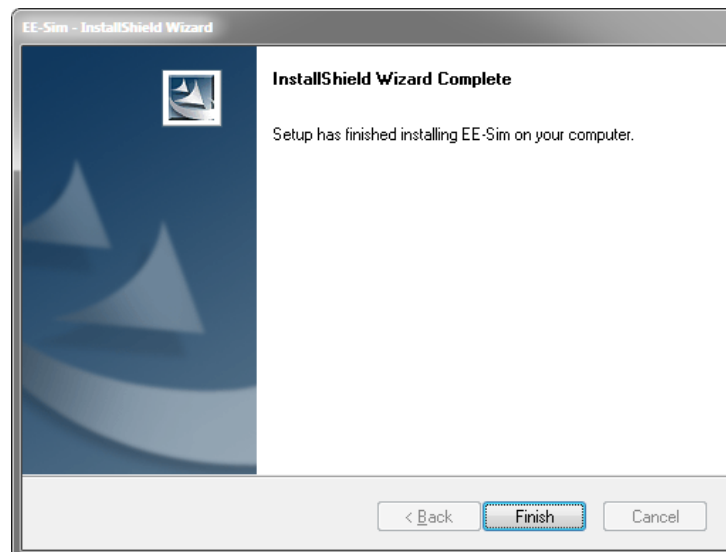
5. In the **Choose Destination Location** window, if you accept the default folder destination, click **Next** to continue. To specify a different directory, click **Browse**, navigate to another folder, and select it. Then, click **Next**.



6. In the **Ready to Install the Program** window, click **Install**.



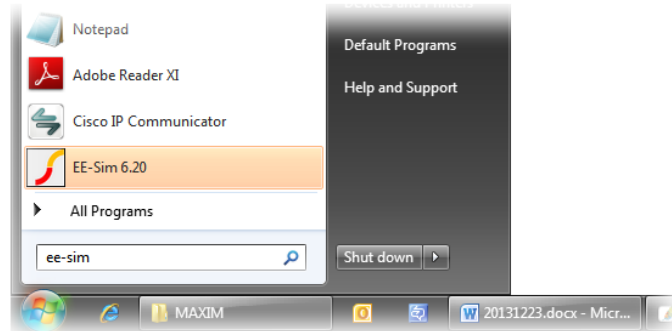
7. A window appears to notify you that the installation is complete. Click **Finish**.



8.3 Start Using the EE-Sim Application for Windows

Follow these steps after the installation to open the offline application and get started.

1. From your Microsoft Windows desktop, click **Start** and then click **EE-Sim**. You can also type **ee-sim** into the search field.

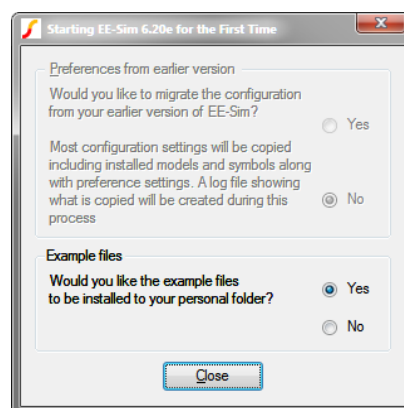


Windows 10 or 8.1 users can start EE-Sim by tapping or clicking its Start tile located with their other applications:

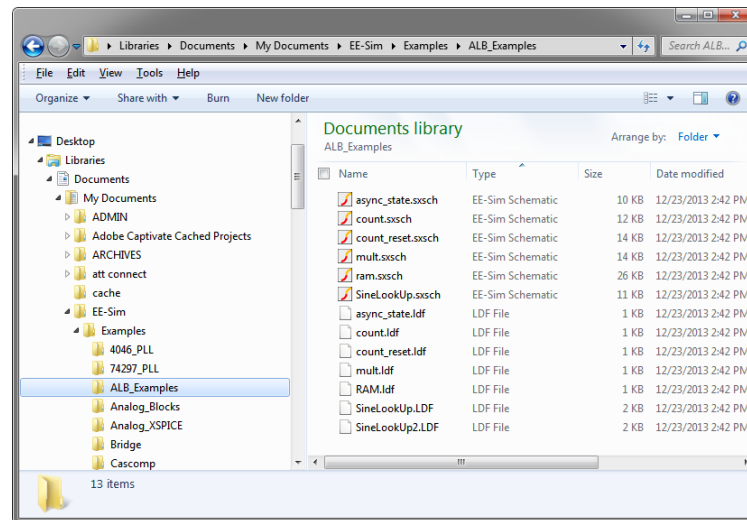


NOTE: Windows 10 or 8.1 users can customize their EE-Sim tile or can create desktop shortcuts including a Quick Launch toolbar just like previous versions of Windows.

2. In the **Starting EE-Sim for the First Time** message box, select the following options:
 - a. **Preferences from Earlier Version:** This option only applies if you had a previous version of EE-Sim installed on your PC. Click **Yes** to migrate your old configuration settings or click **No** to start over with new settings copied from the installer.
 - b. **Example Files:** Click **Yes** to install example files including schematics and instructional materials or click **No** to skip this optional content.



If you click **Yes** for the example files, they appear in your **My Documents** folder in a series of sub-folders as shown below:



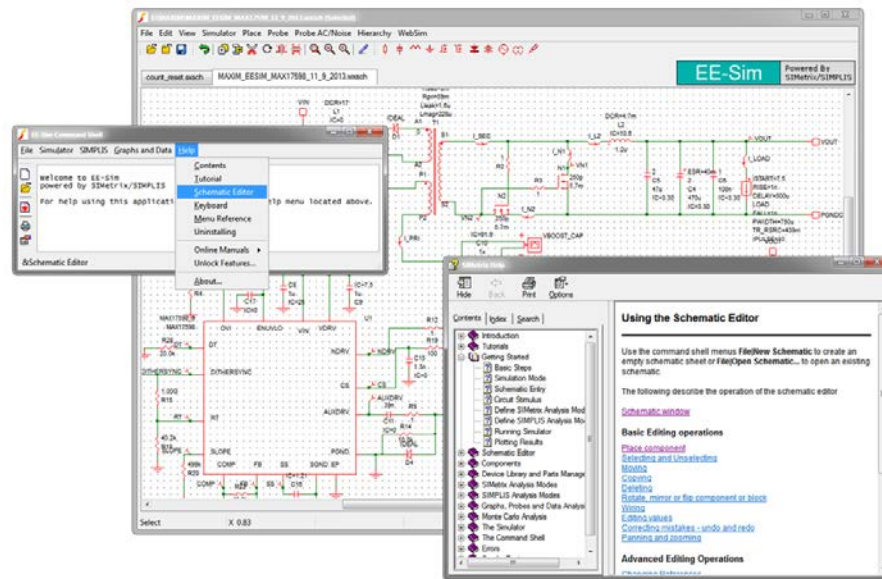
c. After selecting your **Yes** or **No** options, click **Close**.

3. At the EE-Sim startup window, click **OK**.



4. To open a schematic from the small command shell window, choose **Open Schematic** from the **File** menu. To open a schematic from the editor window, choose **Open** from the **File** menu. EE-Sim schematic files end in either of the following extensions:

- xsch
- wxsch



5. Click **Help** in the command shell window to open detailed help files.

8.4 Download a Schematic

In the DC-DC Converters and Filter tools, you can download a schematic and edit it in EE-Sim SE.

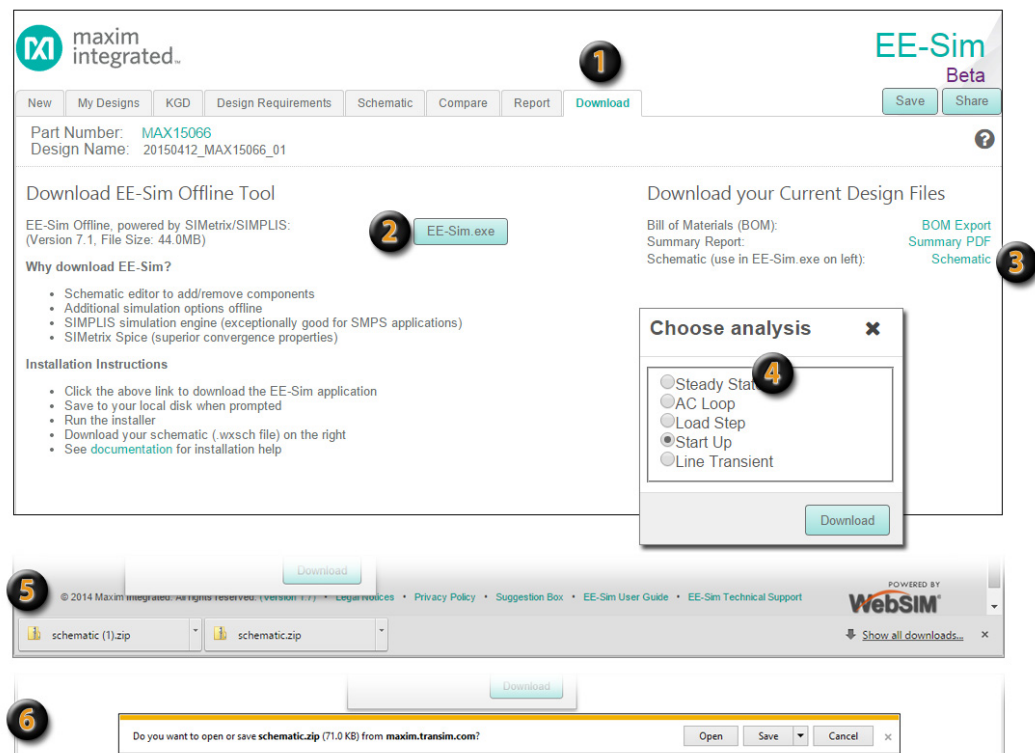
1. Navigate to www.maximintegrated.com and start the online edition of EE-Sim.
2. Click the **My Designs** tab or the **Maxim Designs** tab to open a design.
3. Click the **Download** tab.
4. Under the **Download your Current Design Files** heading, click the **Schematic** link.
5. For DC-DC converter designs, in the **Choose Analysis** pop-up window, select one of the following values:
 - Steady State
 - AC Loop
 - Load Step
 - Start Up
 - Line Transient

NOTE: The load, voltage source (VIN), and simulation settings in EE-Sim SE are configured based on which analysis type you select. The same schematic will download for each of these simulation types. The only difference is that the Load, input voltage source VIN and simulator setting will be preset to match those used online for this simulation type. This makes it much easier to get started simulating in EE-Sim SE. To run a different analysis in EE-Sim SE, you can return to the online tool and select a different analysis type, or you can manually configure the simulation in EE-Sim SE.

6. Click **Download**.
7. For help using EE-Sim SE, open the EE-Sim Command Shell and visit the resources available under the **Help** menu.
8. If you save the schematic.zip file for several types of analysis, note the file names indicate the analysis type. For example: MAX15066_SS.wxsch, MAX15066_AC.wxsch, MAX15066_LS.wxsch, MAX15066_SU.wxsch, MAX15066_LTR.wxsch.

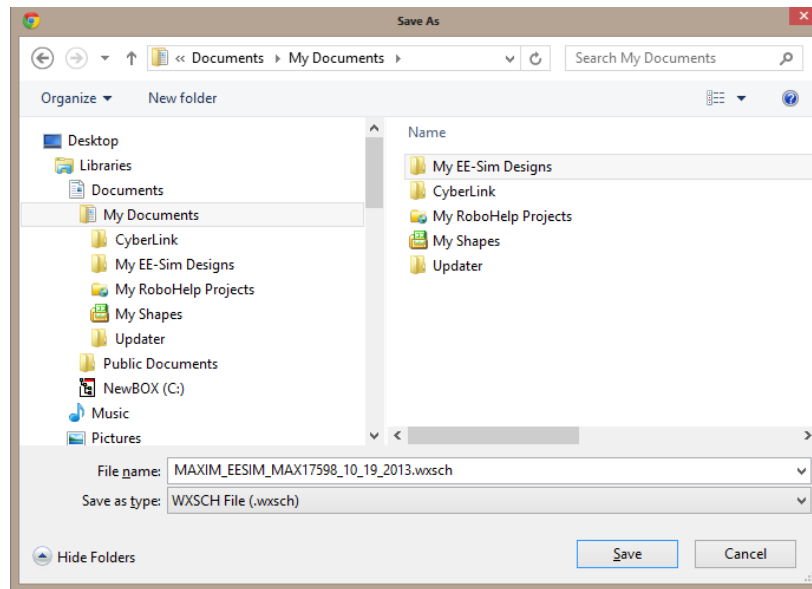
- a. For Internet Explorer users, click **View Downloads** from the download bar at the bottom of your page, or click the **Tools** menu and choose **View Downloads (Ctrl+J)**. Click **Options** to set the default download location.
 - b. For Google Chrome users, click **Show all downloads...** and then click **Show in folder** or open a .zip file directly.
9. To edit the .wxsch schematic file, open the zip archive file and then drag the schematic file to a folder where you can view and edit your schematic files in the EE-Sim SE application for Windows. You can also right-click the .zip file and choose **Extract All** to select a folder.
 10. Close the **Choose Analysis** window.

Refer to the following graphic for download examples in Google Chrome and Internet Explorer.



- 1 **Download Designs:** Click this tab when you are ready to download your schematic. You can also download the offline application on this page.
- 2 **EE-Sim Offline Application:** Download and install the EE-Sim executable application to continue your design work and run additional simulations from your Windows PC.
- 3 **Current Schematic:** You can download your design data and schematic diagram as a .wxsch file for offline editing. Click **Schematic**. The bill of materials (BOM) and summary report are also available for download.
- 4 **Choose Analysis:** Select the type of simulation test data to export with your schematic using this window. After you click **Download**, this window continues to appear and allows you to make another selection and download another schematic. Or, you can click the **X** to close the window.
- 5 **Google Chrome:** Downloaded schematics appear in separate zip files in a downloads panel along the bottom of the page.
- 6 **Internet Explorer:** In the download bar, click the **Save** button and then choose **Save as to assign a unique name to the file**. In the resulting **Save As** dialog box, you can save this file in any folder.

NOTE: You can save your downloaded design schematic files in any folder including the **EE-Sim** folder that is created under **My Documents** when you installed the EE-Sim Windows application and example files.





Maxim Integrated cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim Integrated product. No circuit patent licenses are implied. Maxim Integrated reserves the right to change the circuitry and specifications without notice at any time. The parametric values (min and max limits) shown in the Electrical Characteristics table are guaranteed. Other parametric values quoted in this data sheet are provided for guidance.

Maxim Integrated, 160 Rio Robles, San Jose, CA 95134 USA

©2015 Maxim Integrated Products, Inc.

Maxim Integrated and the Maxim Integrated logo are trademarks of Maxim Integrated Products, Inc.