WP195 (v1.1) May 19, 2003

Creating and Editing XPower XML Files

By: Tony Thomas

As device sizes increase and operating frequencies rise, power consumption and thermal management become critical. The XPower tool from Xilinx allows users to perform the following tasks:

- Estimate a design's power usage.
- Save settings in an XML file.
- Edit the XML file outside of XPower in a text editor.
- Open the XML file and its edited settings in XPower.

Introduction

XML is a meta-markup language for text documents. Data is available in XML documents as strings. The data is enclosed by text labels that depict the data. XPower supports the application of user power data via an XML file, which can be used for report generation as well as to initialize all user-input data. Some output-only fields are ignored or replaced on input. XPower uses an XML file to save and restore current settings.

Here are a few compelling reasons for editing the XML settings file outside of XPOWER:

- The fields for some parameters (such as quiescent current and I/O enable rates) are not editable from the graphical user interface (GUI); these can be altered only in the XML file.
- XPower users who prefer to use the command line interface will find an editable XML settings file very useful when they want to make simple changes, such as tweaking the voltage, glue and heatsink, or ambient temperature.

To compare power with a variety of settings, multiple XML settings files can be created and a simple script can be used to edit them accordingly.

Estimating a Design's Power Usage

Use XPower to estimate a design's power usage. (See the XPower online help for information on how to use XPower.)

Saving Current Settings in an XML File

As shown in Figure 1, save the settings entered when estimating a design's power usage by selecting File > Save Settings File from the XPower menu bar. (Note: To save the settings in a different location or under a different name than the default, select File > Save Settings As.

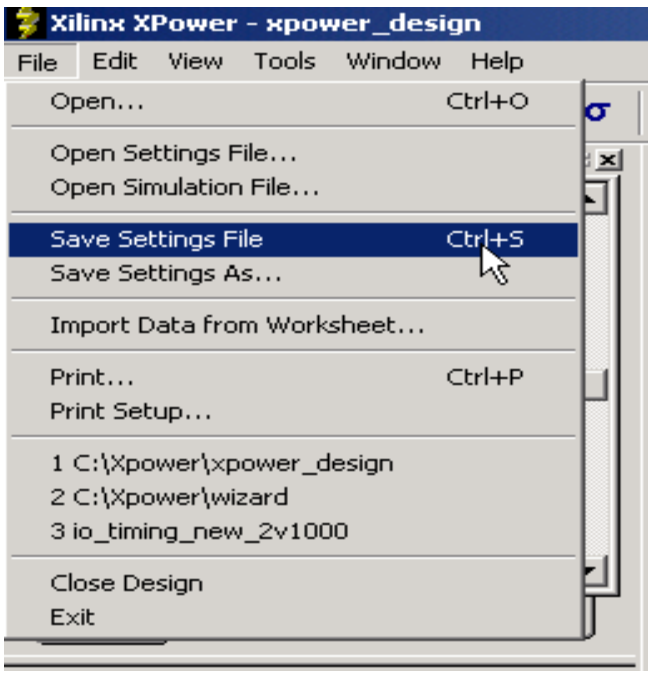


Figure 1: **File > Save Settings File Command**

XPower generates an XML file using the current state of the power data constrained by specific reporting options, and it saves the settings as an XML file with an **`_xpwr.xml`** extension, as shown in Figure 2.

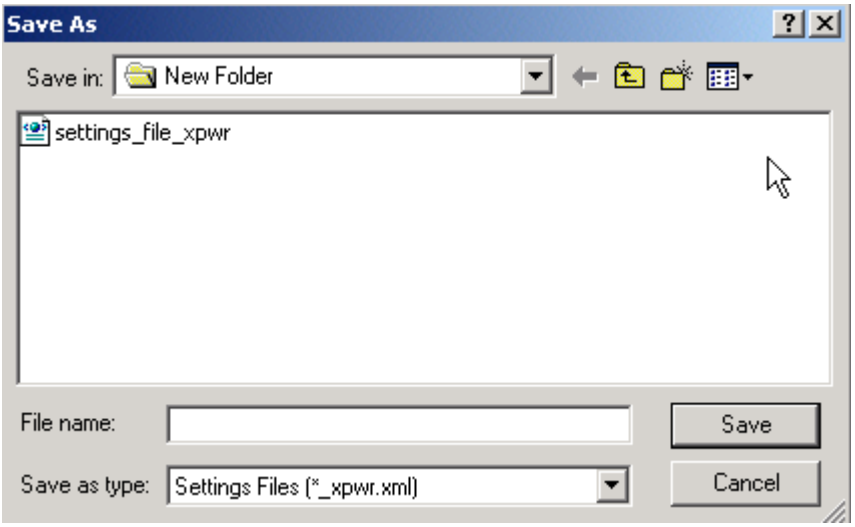


Figure 2: **Saving *_xpwr.xml as the Settings File**

XML Settings File Example

The following is an XML settings file generated by XPower:

```
<!DOCTYPE Power_Manager PUBLIC "-//XILINX// DTD
$XILINX/data/xml/Power/Power_Manager.dtd//EN" "">

<Power_Manager version="1.0" date="17-Jun-02" creator="tthomas">
<!-- define the operating environment -->
<Power_Head>
 <Power_Environment voltage="2.3v" ambient="60C">
  <Power_Voltage source="VDDE" voltage="1.8"/>
  <Power_Voltage source="Vcco25" voltage="2.5"/>
  <Power_Voltage source="Vccaux" voltage="3.3" quiescent="10mA"/>
 </Power_Environment>
 <!-- define some globals and defaults -->
 <Power_Defaults>
  <Power_Activity rate="100%"/>
  <Power_Activity period="20ns"/>
  <Power_Load cap = "5pF"/>
  <Power_Load iostd="LVTTL" cap="11pF" DC="12mA"/>
 </Power_Defaults>
</Power_Head>
<Power_Body>
 <!-- example of how to define some individual net activity rates -->
 <Power_Net name="count_1"><Power_Activity rate="25%"/></Power_Net>
 <Power_Net name="count_4"><Power_Activity freq="30Mhz"/></Power_Net>
 <Power_Net name="count_8"><Power_Activity period="30ns"/></Power_Net>
 <Power_Net name="reset_IBUF"><Power_Activity rate="0hz"
src="Client"/></Power_Net>

<!-- External loads -->
 <Power_Load ioname="msb_OBUF" cap="10pF" DC="12mA" enable="40.0"/>

</Power_Body>
</Power_Manager>
```

Editing the XML File Outside of XPower in a Text Editor

Settings saved in the XML file can be edited outside of XPower, as follows:

1. Locate the XML file. The default location is the same directory as the design file.
2. Open the XML file in a text editor.
3. Make any desired changes. See below for a list of tips and precautions.
4. Save the edited file.

Consider the following tips and precautions when editing XML files:

- Back up the XML file before making any edits.
- Use a Windows text editor such as WordPad or Notepad , or use a UNIX editor such as vi. (Note that Notepad ignores newline characters; all text appears as one long line.)
- Do not edit anything unless sure of the change and unless a correct choice exists. For example, the following code is incorrect:

```
<Power_Activity rate="100.000000%" src="INCORRECT" duty="0.000%" />
Â </Power_Net>
```

A correct version of this XML code reads as follows:

```
<Power_Activity rate="100.000000%" src="Simulation" duty="0.000%" />
Â </Power_Net>
```

- Do not set a parameter to an unsupported value. For example, only four supported values exist for airflow. If values assigned are unsupported, XPower automatically uses default values. (See the XPower documentation for acceptable values and ranges.)
- Be careful with values that might be acceptable but which are outside the recommended range. For example, a value of 6 for V_{CCINT} is not in the recommended range [1.425 to 1.575] for a Virtex™-II device. XPower accepts the value even though it is outside the recommended range; however, it does issue a warning.

Editing Examples

Figure 3 shows the setting for Quiescent Current in the original design displayed in the XPower GUI.

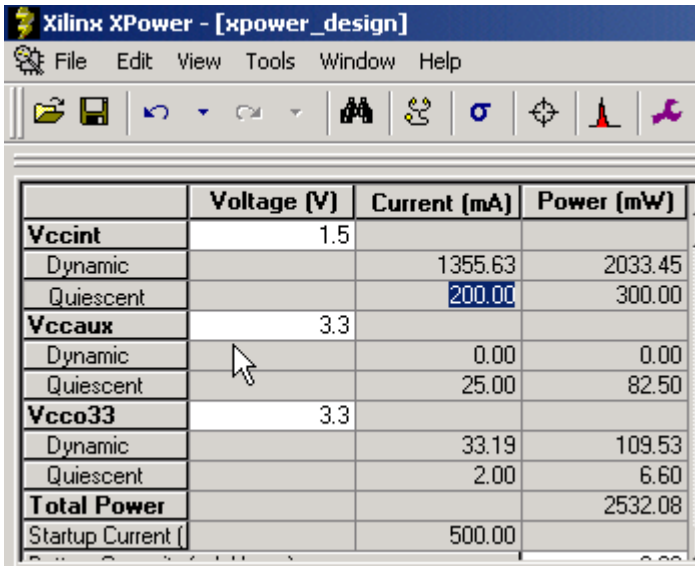


Figure 3: **Original Design: Quiescent Current = 200 mA**

Figure 4 shows code in the original XML settings file.

```
  <Power_Environment voltage="1.55" ambient="25.0C" airflow="0LFM" thetaja="12C/W" battery="0mAh" parttype="commercial" glue=\
"0C/W" heatsink="0C/W">
    <Power_Voltage source="Vccint" voltage="1.5" quiescent="200.00" startup="500.00"/>
    <Power_Voltage source="Vccaux" voltage="3.3" quiescent="25.00" startup="100.00"/>
    <Power_Voltage source="Vcco33" voltage="3.3" quiescent="2.00" startup="100.00"/>
  </Power_Environment>
```

Figure 4: **Original Settings File: Quiescent Current = 200 mA**

Figure 5 shows code in the edited XML settings file.

```
  <Power_Environment voltage="1.55" ambient="25.0C" airflow="0LFM" thetaja="12C/W" battery="0mAh" parttype="commercial" glue=\
"0C/W" heatsink="0C/W">
    <Power_Voltage source="Vccint" voltage="1.5" quiescent="195.00" startup="500.00"/>
    <Power_Voltage source="Vccaux" voltage="3.3" quiescent="25.00" startup="100.00"/>
    <Power_Voltage source="Vcco33" voltage="3.3" quiescent="2.00" startup="100.00"/>
  </Power_Environment>
```

Figure 5: **Edited XML file: Quiescent Current = 195 mA**

Opening the XML File and Viewing Edited Settings in XPower

After editing and saving the XML settings file, reopen it in XPower to load the latest changes into XPower. Open the XML file in XPower, as follows:

1. Select File > Open from the XPower menu bar.
2. As shown in Figure 6, locate and select the XML file to open.

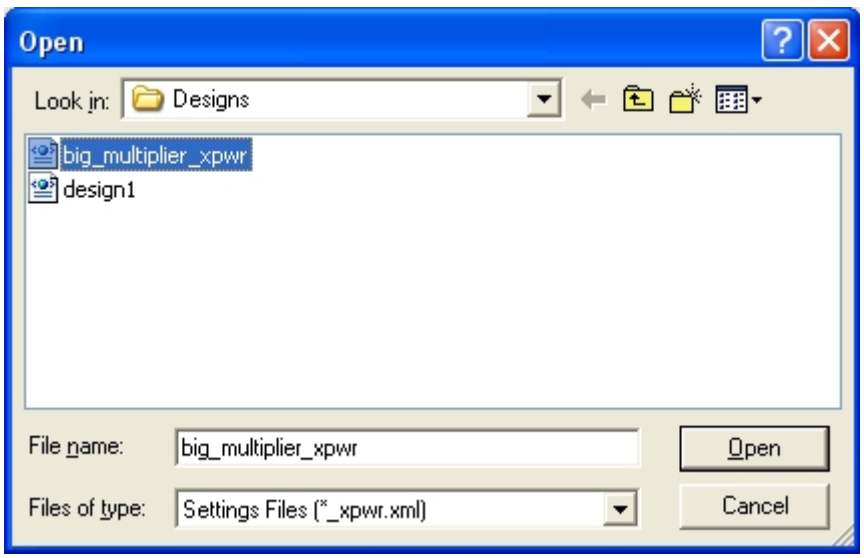
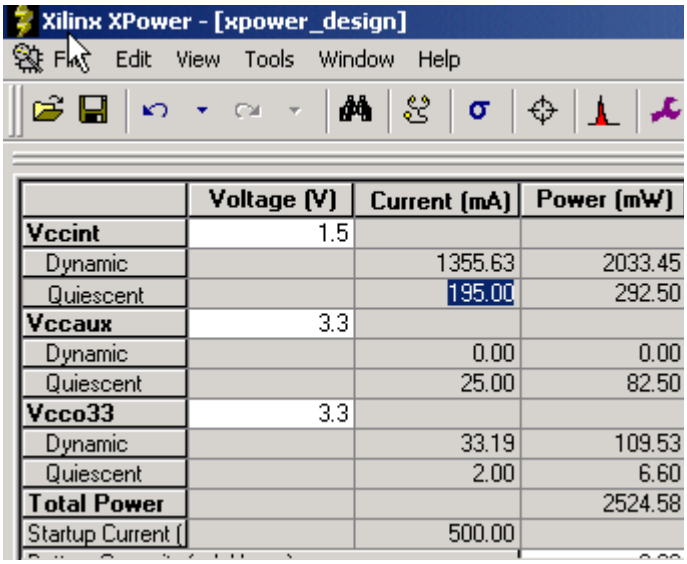


Figure 6: **Open Settings File Dialog Box**

3. Click OK. XPower loads the XML file and its edited settings into the current design.
4. As shown in Figure 7, the new settings are reflected in the XPower interface.



	Voltage (V)	Current (mA)	Power (mW)
Vccint	1.5		
Dynamic		1355.63	2033.45
Quiescent		195.00	292.50
Vccaux	3.3		
Dynamic		0.00	0.00
Quiescent		25.00	82.50
Vcco33	3.3		
Dynamic		33.19	109.53
Quiescent		2.00	6.60
Total Power			2524.58
Startup Current (		500.00	

Figure 7: **Settings After the XML File Is Reloaded Into XPower**

Notice the change in quiescent current and in the resulting total power after loading the edited XML settings file.

Conclusion

Editing the XML settings file is an easy way to set values such as quiescent current, which cannot be changed in the XPower GUI. To avoid errors when editing the file, refer to the simple rules presented in this document.

Revision History

The following table shows the revision history for this document.

Date	Version	Revision
04/30/03	1.0	Initial Xilinx release.
05/19/03	1.1	Minor edits throughout.