

### Introduction

The MegaWizard® Plug-In Manager in the Quartus® II software creates or modifies design files that contain custom megafunction variations. These auto-generated MegaWizard files can then be instantiated in a design file. The MegaWizard Plug-In Manager provides a MegaWizard that allows you to specify options for the ALT2GXB\_RECONFIG megafunction.

Start the MegaWizard Plug-In Manager using one of the following methods:

- Choose the **MegaWizard Plug-In Manager** command (Tools menu).
- When working in the Block Editor (schematic symbol), click **MegaWizard Plug-In Manager** in the **Symbol** dialog box (Edit menu > Insert Symbol).
- Start the stand-alone version of the MegaWizard Plug-In Manager by typing the following command at the command prompt: `qmegawi.z`.

### Dynamic Reconfiguration

This section provides descriptions of the options available on the individual pages of the ALT2GXB\_RECONFIG MegaWizard Plug-In Manager.



The MegaWizard Plug-In Manager provides a warning if any of the settings you choose are illegal.

Figure 5-1 shows the first page of the MegaWizard Plug-In Manager. To generate an ALT2GXB\_RECONFIG custom megafunction variation, select **Create a new custom megafunction variation**. Click **Next**.

**Figure 5-1. MegaWizard Plug-In Manager (Page 1)**

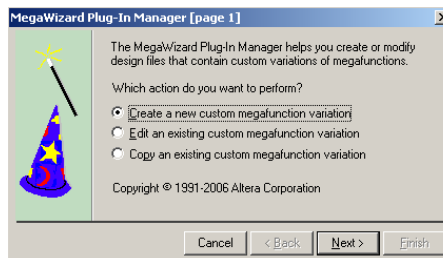


Figure 5–2 shows the second page of the MegaWizard Plug-In Manager. Select the following options (click **Next** when you are done):

- **ALT2GXB\_RECONFIG megafunction** option, under the I/O folder.
- **Stratix II GX** as the device family.
- Your desired type of output file format (**Verilog**, **VHDL**, or **AHDL**).
- Your desired file name.



For the design to compile successfully, you must enable the dynamic reconfiguration controller in the `alt2gxb` instance.

**Figure 5–2. MegaWizard Plug-In Manager - ALT2GXB\_RECONFIG (Page 2)**

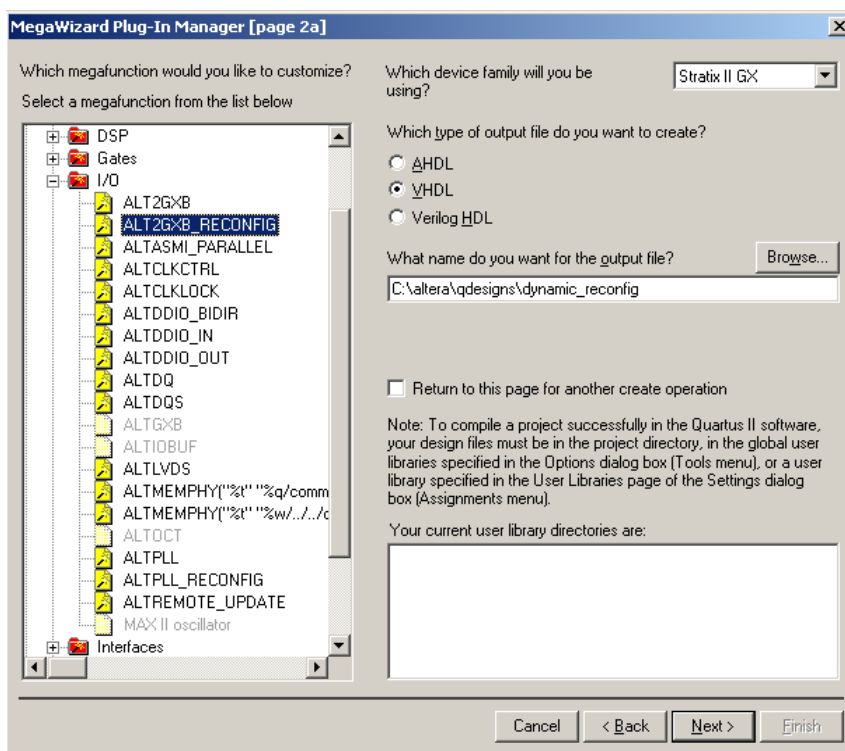


Figure 5–3 shows page 3 of the ALT2GXB\_RECONFIG MegaWizard Plug-In Manager. From the drop-down menu, select the number of channels controlled by the reconfig controller. Check off the reconfig controller features that you would like to activate; for example, Analog controls, Channel Reconfiguration, change the local divider values of the transmitter or Channel and TX PLL reconfiguration.

Figure 5–3. MegaWizard Plug-In Manager - ALT2GXB\_RECONFIG (Reconfiguration Settings)

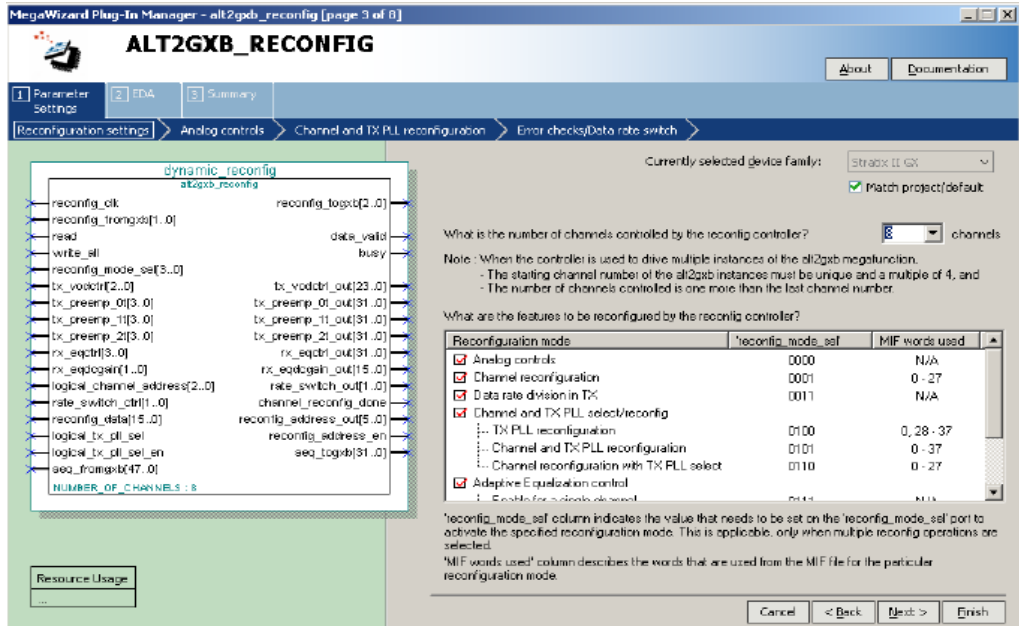


Table 5–1 describes the available options on page 3 of the MegaWizard Plug-In Manager for your ALT2GXB\_RECONFIG custom megafunction variation. Select the **Match project/default** option if you want to change the device **Currently selected device family** options.

Make your selections on Page 3 and click **Next**.

**Table 5–1. MegaWizard Plug-In Manager Options (Page 3) (Part 1 of 2)**

ALT2GXB_RECONFIG Setting	Description	Reference
<p>What is the number of channels controlled by the reconfig controller?</p>	<p>Depending on this setting, ALT2GXB_RECONFIG generates the required signal width for the interface signal (RECONFIG_FROMGXB) to <code>alt2gxb</code> and also gives the necessary bus width for all the selected physical media attachment (PMA) signals. For this setting, Altera® recommends that if there are multiple controllers for multiple instances of <code>alt2gxb</code>, then the setting is same as the number of channels set in the <code>alt2gxb</code> instance. If a single controller controls multiple instances of <code>alt2gxb</code>, the setting is rounded up to the multiple of the nearest transceiver (for the number of transceivers needed to fit the channels selected for that instance). Depending on the number of channels set, the resource estimate changes because this is a soft implementation that uses fabric logic resources. The resource estimate is shown in the bottom left of page 3 of the MegaWizard.</p>	<p><i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i>.</p>

**Table 5–1. MegaWizard Plug-In Manager Options (Page 3) (Part 2 of 2)**

ALT2GXB_RECONFIG Setting	Description	Reference
<p>What are the features to be reconfigured by the reconfig controller?</p>	<p>Three available selections are:</p> <p><b>Analog Controls</b> – Allows dynamic reconfiguration of PMA settings like Equalization, Pre-emphasis, DC Gain, and <math>V_{OD}</math></p> <p><b>Channel Reconfiguration</b> – Allows dynamic reconfiguration of the transceiver channel from one pre-configured functional mode to another pre-configured functional mode. This includes switching from one protocol to another, as well as a data rate switch within BASIC mode. For example, dynamic reconfiguration from SONET/SDH to GIGE mode.</p> <p><b>Data rate division in TX</b> – Allows dynamic switch of the CMU local clock divider. Division factors of 1, 2, and 4 are supported. For example, dynamic rate switching of the transmitter from 4 Gbps to 2 Gbps to 1 Gbps.</p> <p><b>Channel and TX PLL select/reconfig</b> – The following three features are available under this option:</p> <ul style="list-style-type: none"> <li>● TX PLL reconfiguration – Allows dynamic reconfiguration of the TX PLL only.</li> <li>● Channel and TX PLL reconfiguration – Allows dynamic reconfiguration of the transceiver channel from one protocol mode to another and allows reconfiguration of the TX PLL.</li> <li>● Channel reconfiguration with TX PLL select – Allows dynamic reconfiguration of the transceiver channel and allows selecting one of the two TX PLLs that the channel can listen to.</li> <li>● Enable Adaptive Equalization Control – This feature is currently not supported.</li> </ul>	<p><i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i>.</p>

Figure 5–4 shows page 4 of the ALT2GXB\_RECONFIG MegaWizard Plug-In Manager. Page 4 appears only if **Analog Controls** is selected in the "What are the features to be reconfigured by the reconfig controller?" setting on page 3.

Figure 5–4. MegaWizard Plug-In Manager - ALT2GXB\_RECONFIG (Analog Controls)

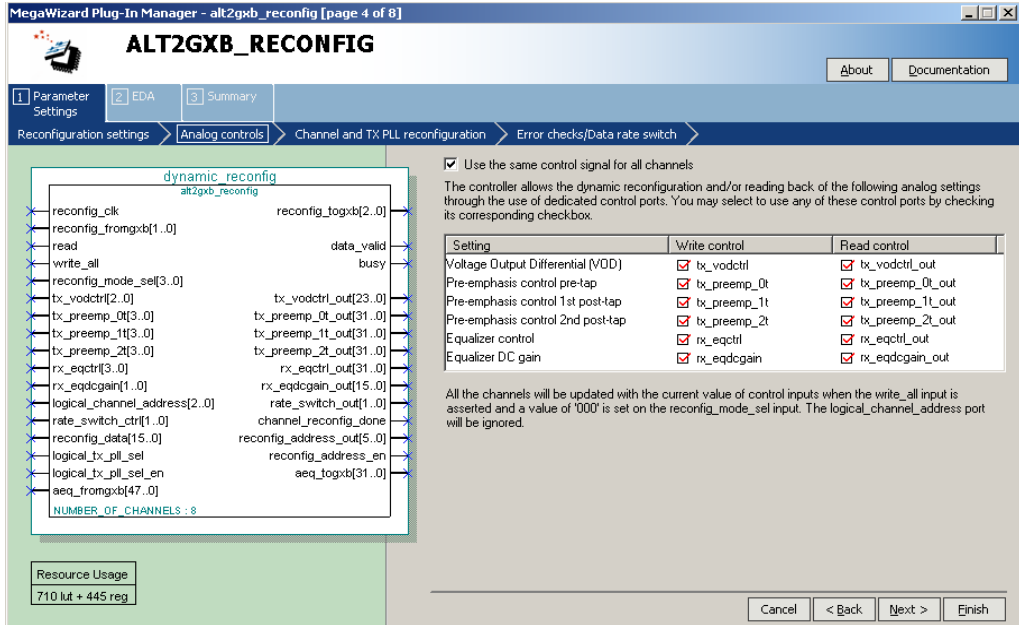


Table 5–2 describes the available options on page 4 of the MegaWizard Plug-In Manager for your ALT2GXB\_RECONFIG custom megafunction variation.

Make your selections on page 4 and click **Next**.

**Table 5–2. MegaWizard Plug-In Manager Options (Page 4) (Part 1 of 2)**

<b>ALT2GXB_RECONFIG Setting</b>	<b>Description</b>	<b>Reference</b>
Use the same control signal for all channels (grayed out in Figure 5–4)	In Figure 5–4, this option is grayed out because it is not applicable for a one-channel instance. If the number of channels controlled by the controller is more than one, this setting is enabled. The setting is checked if the design needs the same control signal written into all channels simultaneously. If the design requires the control signal to write in and read out of individual channels, then the setting is not checked.	Dynamic Reconfiguration Setup in the MegaWizard Plug-In Manager section in the <i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .

**Table 5–2. MegaWizard Plug-In Manager Options (Page 4) (Part 2 of 2)**

ALT2GXB_RECONFIG Setting	Description	Reference
Write Control	<p>PMA write control signals are as follows:</p> <ul style="list-style-type: none"> <li>● Voltage Output Differential (<math>V_{OD}</math>) – 3 bits per channel</li> <li>● Pre-emphasis control pre-tap – 4 bits per channel</li> <li>● Pre-emphasis control 1st post-tap – 4 bits per channel</li> <li>● Pre-emphasis control 2nd post-tap – 4 bits per channel</li> <li>● Equalizer control – 4 bits per channel</li> <li>● Equalizer DC gain – 2 bits per channel</li> </ul> <p>These are optional signals. The signal widths are based on the setting you entered for the “What is the number of channels controlled by the controller?” option. At least one write signal must be enabled to configure and use the dynamic reconfiguration controller.</p>	Channels and PMA Controls Reconfiguration section of the <i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .
Read Control	<p>PMA read control signals are:</p> <ul style="list-style-type: none"> <li>● Voltage Output Differential (<math>V_{OD}</math>)</li> <li>● Pre-emphasis control pre-tap – 4 bits per channel</li> <li>● Pre-emphasis control 1st post-tap – 4 bits per channel</li> <li>● Pre-emphasis control 2nd post-tap – 4 bits per channel</li> <li>● Equalizer control – 4 bits per channel</li> <li>● Equalizer DC gain – 2 bits per channel</li> </ul> <p>These are optional signals. The signal widths are based on the setting you entered for the “What is the number of channels controlled by the controller?” option. The read out option is enabled for selection if the corresponding write control is selected. The read out option enable is not independent of write control. Read and write cannot be performed simultaneously into these PMA read control signals and PMA write control signals.</p>	Channels and PMA Controls Reconfiguration section of the <i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .



Figure 5–5 shows page 5 of the ALT2GXB\_RECONFIG MegaWizard Plug-In Manager. Page 5 appears only if **Channel Reconfiguration** is selected in the "What are the features to be reconfigured by the reconfig controller?" setting on page 3.

Figure 5–5. MegaWizard Plug-In Manager - ALT2GXB\_RECONFIG (Channel and TX PLL Reconfiguration)

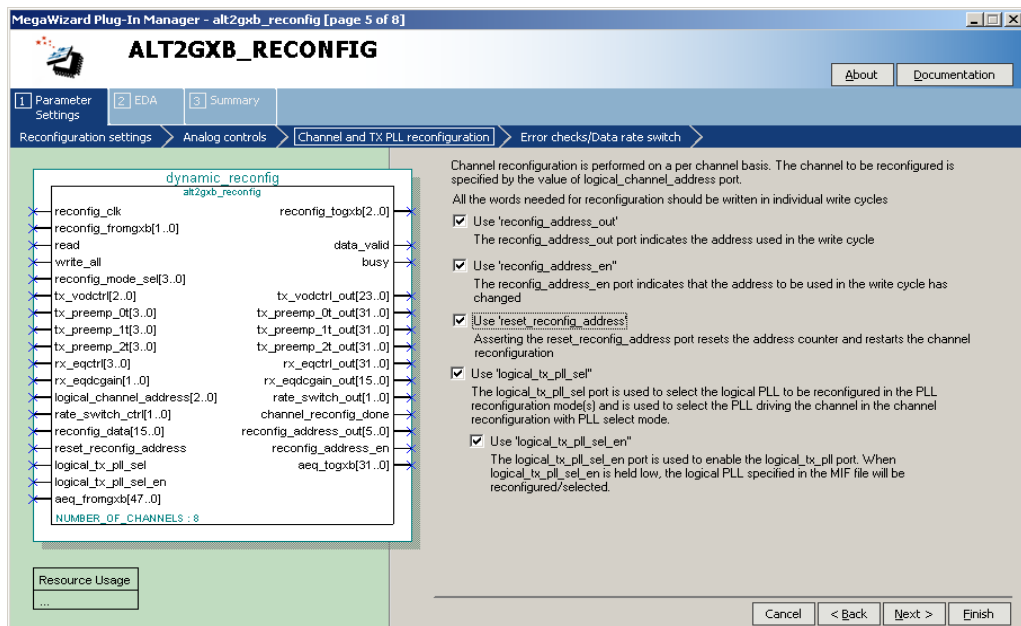


Table 5–3 describes the available options on page 5 of the MegaWizard Plug-In Manager for your ALT2GXB\_RECONFIG custom megafunction variation.

Make your signal selection on page 5 and click **Next**.

**Table 5–3. MegaWizard Plug-In Manager Options (Page 5) (Part 1 of 2)**

<b>ALT2GXB_RECONFIG Setting</b>	<b>Description</b>	<b>Reference</b>
Use reconfig_address_out	The value on this optional port indicates the address associated with the words (reconfig instructions) in the .mif. Each dynamic configuration feature requires a maximum of 28 or 38 addresses. For example, if the Channel Reconfiguration feature is selected, the dynamic reconfiguration controller automatically increments the address from 0 to 27. If the Channel and TX PLL Reconfiguration feature is selected, the address is incremented from 0 to 37. Therefore, the width of the reconfig_address_out is set to either <b>5-bits</b> or <b>6-bits</b> wide, depending on the feature selected. The dynamic reconfiguration controller automatically increments the address at the end of each write cycle.	<i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .
Use reconfig_address_en	When high, this optional output status signal indicates that the address to be used in the write cycle has changed. This signal gets asserted when the write transaction is completed (busy signal de-asserted).	<i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .
Use reset_reconfig_address	When asserted, this optional control signal resets the current reconfiguration address to 0.	<i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .

**Table 5–3. MegaWizard Plug-In Manager Options (Page 5) (Part 2 of 2)**

ALT2GXB_RECONFIG Setting	Description	Reference
Use logical_tx_pll_sel	<p>This is an optional control signal. The functionality of the signal depends on the feature selected, as shown below:</p> <ul style="list-style-type: none"> <li>• TX PLL reconfiguration – The corresponding TX PLL is reconfigured based on the value on this signal.</li> <li>• Channel and TX PLL reconfiguration – The corresponding TX PLL is reconfigured based on the value on this signal. The transceiver channel listens to the TX PLL selected by this signal.</li> <li>• Channel reconfiguration with TX PLL select - The transceiver channel listens to the TX PLL selected by this signal.</li> </ul>	Channel and CMU PLL Reconfiguration section in the <i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .
Use logical_tx_pll_sel_en	<p>This is an optional control signal. When this signal is enabled in the ALT2GXB_Reconfig Megawizard, the value set on the logical_tx_pll_sel signal is valid only if the logical_tx_pll_sel_en is set to 1.</p> <p>For more information, refer to the “Logical TX PLL Select” section in the <i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i>.</p>	Channel and CMU PLL Reconfiguration section in the <i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .

Figure 5–6 shows page 6 of the ALT2GXB\_RECONFIG MegaWizard Plug-In Manager. Page 6 appears only if the **Data rate division in TX** is selected in the "What are the features to be reconfigured by the reconfig controller?" setting on page 3.

Figure 5–6. MegaWizard Plug-In Manager - ALT2GXB\_RECONFIG (Error Checks/Data Rate Switch)

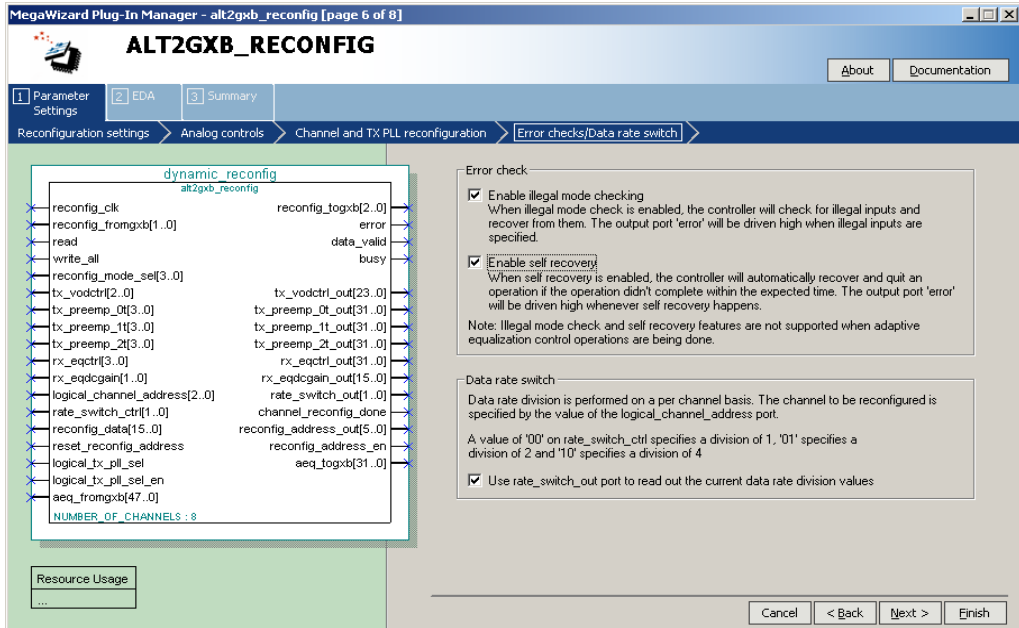


Table 5–4 describes the available options on page 6 of the MegaWizard Plug-In Manager for your ALT2GXB\_RECONFIG custom megafunction variation.

Make your selections on page 6 and click **Next**.

<b>Table 5–4. MegaWizard Plug-In Manager Options (Page 6)</b>		
<b>ALT2GXB_RECONFIG Setting</b>	<b>Description</b>	<b>Reference</b>
Enable illegal mode checking	When this option is selected, the ALT2GXB_RECONFIG MegaWizard provides the <code>error</code> output port. The dynamic reconfiguration controller checks for specific unsupported options within 2 <code>reconfig_clk</code> cycles, de-asserts the <code>busy</code> signal and asserts the <code>error</code> output port for 2 <code>reconfig_clk</code> cycles. The dynamic reconfiguration controller does not execute the unsupported operation.	<i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .
Enable self recovery	When this option is selected, the ALT2GXB_RECONFIG MegaWizard provides the <code>error</code> output port. The dynamic reconfiguration controller quits an operation if it did not complete within the expected number of clock cycles. After recovering from the illegal operation, the dynamic reconfiguration controller de-asserts the <code>busy</code> signal and asserts the <code>error</code> output port for 2 <code>reconfig_clk</code> cycles.	<i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .
Use the <code>rate_switch_out</code>	Port to read out the current data rate division values. This optional output status port reads out the current setting on the CMU local divider.  00 — Division of 1 01 — Division of 2 10 — Division of 4 11 — illegal value (do not use this value)	<i>Stratix II GX Dynamic Reconfiguration</i> chapter in volume 2 of the <i>Stratix II GX Device Handbook</i> .

Figure 5–7 shows page 7 (the Simulation Libraries page) of the MegaWizard Plug-In Manager for the Dynamic Reconfiguration selection.

Click Next.

Figure 5–7. MegaWizard Plug-In Manager - ALT2GXB\_RECONFIG (Simulation Libraries)

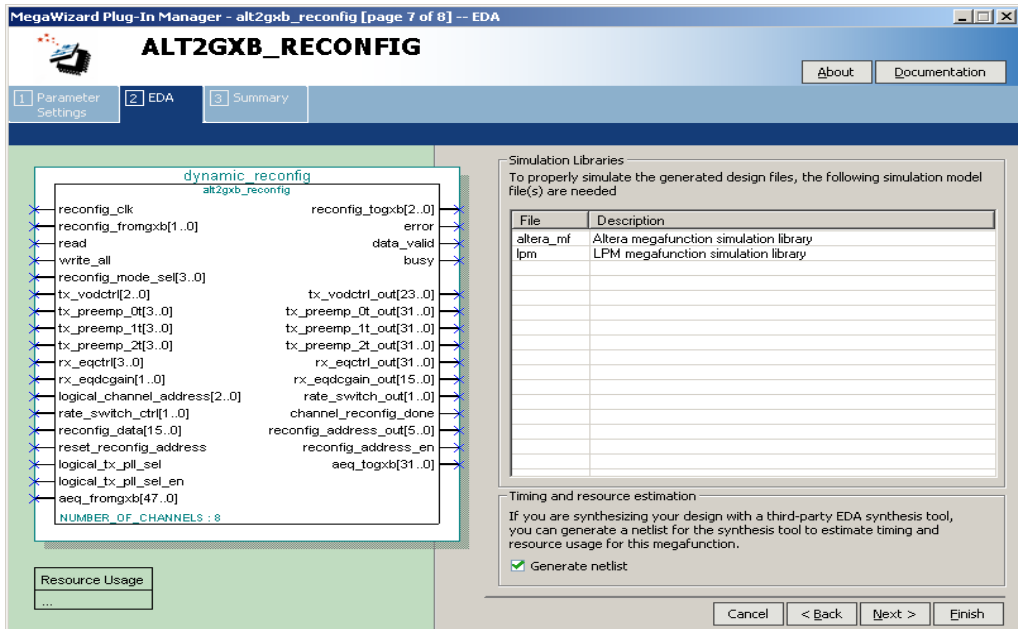


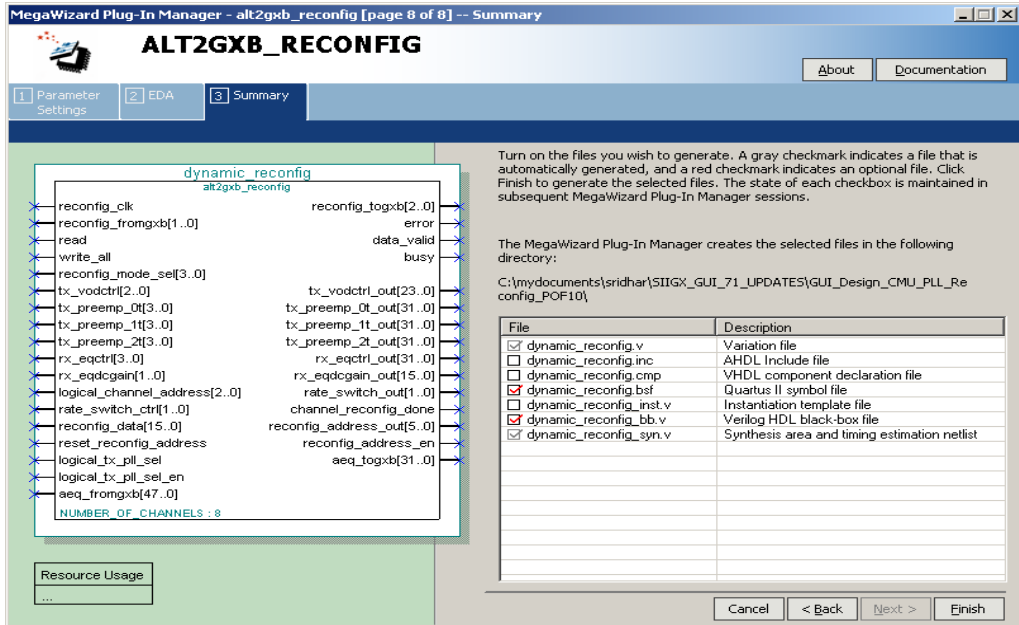
Table 5–5 describes the available option on page 7 of the MegaWizard Plug-In Manager for your ALT2GXB\_RECONFIG custom megafunction variation.

Make your selections on page 7 and click **Next**

<b>Table 5–5. MegaWizard Plug-In Manager Options (Page 7)</b>	
<b>ALT2GXB_RECONFIG Setting</b>	<b>Description</b>
Generate a netlist for synthesis area and timing estimation	Selecting this option generates a netlist file that third party synthesis tools can use to estimate the timing and resource usage

Figure 5–8 shows page 8 (the last page) of the MegaWizard Plug-In Manager for the Dynamic Reconfiguration protocol set up. You can select optional files on this page. After you make your selections, click **Finish** to generate the files.

Figure 5–8. MegaWizard Plug-In Manager - ALT2GXB\_RECONFIG (Summary)



## Referenced Document

This chapter references the following document:

- [Stratix II GX Dynamic Reconfiguration](#) chapter in volume 2 of the *Stratix II GX Device Handbook*

## Document Revision History

Table 5–6 shows the revision history for this chapter.

<b>Date and Document Version</b>	<b>Changes Made</b>	<b>Summary of Changes</b>
October 2007 v1.4	Updated Table 5–4.	—
	Updated all the figures in this chapter.	—
	Added “Referenced Document” section.	—
August 2007 v1.3	Updated Figures 5–2 through 5–8.	—
	Updated Tables 5–1 through 5–4.	—
	Added Table 5–5.	—
	Formerly chapter 4. The chapter number changed due to the addition of the <i>Stratix II GX Dynamic Reconfiguration</i> chapter.	—
February 2007 v1.2	Modified “Introduction”.	Removed one sentence.
	Added the “Document Revision History” section to this chapter.	—
	Changed alt2gxb_reconfig to ALT2GXB_RECONFIG throughout.	Per new style guide convention.
	Added more information describing Figures 5–2 and 5–3.	—
	Updated “Use reconfig_address_out” section of Table 5–3.	—
	Updated “Use the rate_switch_out port to read out the current data rate division value” section of Table 5–4.	—
	Added “Click <b>Next</b> ” instructions after each step.	—
April 2006, v1.1	Updated all the MegaWizard Plug-In Manager figures to match the Quartus II software GUI.	—
February 2006, v1.0	Added chapter to the <i>Stratix II GX Device Handbook</i> .	—