

#### 1. Introduction

Although Macronix serial flash are not currently supported by the Xilinx<sup>®</sup> iMPACT tool, the software can still be used to program Macronix serial flash. This application note describes the steps needed to avoid known issues when using Macronix serial flash with the Xilinx iMPACT tool.

### 2. Serial Flash Preparation for Quad I/O Operation

If the Macronix serial flash will be used in single or dual I/O mode (x1 or x2 bus width) then there is no issue, and this section may be skipped. If however the Macronix serial flash will be used in Quad I/O mode (x4 bus width), the QE (Quad Enable) bit must be set to '1'. The non-volatile QE bit is Bit-6 of the Macronix serial flash Status Register. The iMPACT tool does not automatically program the QE bit on Macronix serial flash.

If the QE bit is not set, the serial flash will ignore Quad Output Fast Read commands sent by the FPGA and the FPGA configuration will fail. A symptom of this failure is that the FPGA's DONE signal does not go high. After programming the flash, users may receive an error message similar to that shown in Figure 2-1. The red box says "Program Failed" however the serial flash successfully programmed and verified (outlined in green), but DONE did not go high (outlined in blue). Setting the QE bit should eliminate the error message.

🐉 ISE IMPACT (P. 58f)
🛞 Elle Edit View Ogerations Qutput Debug Window Help 💦 🚽 🛪
MPACT Flows $\leftrightarrow \Box \sigma \times$ Right click device to select operations
Boundary Scan     Image: Construction of the second s
MPACT Processes ↔ □ ∄ ×
Available Operations are: xc7k325t
Program bypass
Werty TDO Dreament Dailed
Program Progra
Real Real Real Real Real Real Real Real
Cheve
Read Device Status Boundary Scan
Console ↔ 🗗 🗗 🛪
Found Slave on Bus Index.
SPI core clock speed value = 0x&801.
PROGRESS START - Starting Operation.
'1': ID Check passed.
'1': Programming Flash.
'1': Reading device contents
done.
'1': Verification completed.
'l':Programming in x1 mode.
PROGRESS END - End Operation.
1.: Configuration data download to from was not successful, bowl aid not go nigh, please check your configuration setup and mode settings.
< >
Configuration Diglert JTAG-SMT1 1000000

Figure 2-1: "DONE Did Not Go High" Error Message



It is recommended that the QE bit be programmed to '1' prior to installing the serial flash into the system. The QE bit can be set by issuing the WREN command (06h) followed by the WRSR command (01h) with 40h as the data. The RDSR command (05h) can be used to read the Status Register to confirm that the QE bit has been set. Please refer to the product datasheet for additional details. After the QE bit is set, all of the Fast Read (x1) and Dual Output Fast Read (x2) commands are still supported along with the Quad Output (x4) Fast Read command.

The step to set the QE bit can be avoided if the Macronix MX25Lxx**73** series serial flash is used, as the 73 series serial flash have the QE bit permanently set to '1'. At this time however, the 73 series is only available in 3V and in densities from 8Mb to 128Mb (Table 2-1).

Voltage	Part Number	
	32Mb	MX25L3235E
		MX25L3273E
	64Mb	MX25L6435E
2\/		MX25L6473E
3V	128Mb	MX25L12835F
		MX25L12873F
	256Mb	MX25L25635F
	512Mb	MX66L51235F
	32Mb	MX25U3235F
	64Mb	MX25U6435F
1.8V	128Mb	MX25U12835F
	256Mb	MX25U25635F
	512Mb	MX66U51235F

#### Table 2-1: Macronix Quad I/O Mode Serial Flash (32Mb to 512Mb)



#### 3. Operating System Preparation

Currently, the iMPACT tool does not recognize the Manufacturer ID of Macronix serial flash. Users attempting use the iMPACT tool to program Macronix serial flash may encounter an error message stating that the "ID Check failed" and that "the operation did not complete successfully" (Figure 3-1).



Figure 3-1: "ID Check Failed" Error Message

To avoid the error message, set the following operating system environment variable

#### XIL\_IMPACT\_SKIPIDCODECHECK=1

which instructs the iMPACT tool to bypass the ID check, allowing the programming operation to proceed.



The procedure for setting an environment variable varies by operating system. The following sequence shows how to add an environment variable within the Microsoft Windows 7 Professional operating system:

- a) Click the Windows Start Button and open the "Control Panel."
- b) Within the "Control Panel" click "System and Security" followed by "System," which will open the "Basic Information" window.
- c) Click "Advanced system settings" to open the "System Properties" window.

				- • ×
G 🕞 🗢 🔛 א Control Panel א	System and Security 🔸 System	<b>▼</b> 4⁄2	Search Control Panel	Q
Control Panel Home <ul> <li>Device Manager</li> <li>Remote settings</li> <li>System protection</li> <li>Advanced system settings</li> </ul>	View basic information about your computer Windows edition Windows 7 Professional Copyright © 2009 Microsoft Corporation. All rights reserved. Service Pack 1 Get more features with a new edition of Windows 7			
	System			
	Manufacturer:	Dell		
	Rating:	System rating is not availab	le	
	Processor:	Intel(R) Core(TM)2 CPU 2.00GHz 2.00 GHz	T7200 @	
	Installed memory (RAM):	4.00 GB (3.25 GB usable)		
	System type:	64-bit Operating System		
See also	Pen and Touch:	No Pen or Touch Input is a Display	vailable for this	
Action Center	Dell support			
Windows Update	Website:	Online support		
Performance Information and Tools				
	Computer name, domain, and	Macropiy DC	<u>а</u> сь	T The second sec

Figure 3-2: Basic Information Window

![](_page_4_Picture_0.jpeg)

d) In the "System Properties" window, select the "Advanced" tab and then click the "Environment Variables" button which will open an "Environment Variables" window.

System Properties					
Computer Name Hardware Advanced System Protection Remote					
You must be logged on as an Administrator to make most of these changes.					
Performance					
Visual effects, processor scheduling, memory usage, and virtual memory					
Settings					
User Profiles					
Desktop settings related to your logon					
Settings					
Startup and Recovery					
System startup, system failure, and debugging information					
Settings					
Envirogment Variables					
OK Cancel Apply					

Figure 3-3: System Properties

- e) In the "Environment Variables" window click one of the two "New..." buttons to create either a User variable or a System variable. In Figure 3-4 below, a new User variable is being created.
- f) In the "New User Variable" window, enter "XIL\_IMPACT\_SKIPIDCODECHECK" for the Variable name and "1" for the Variable value. Click the "OK" button to add the environment variable.

ironment Varia	bles	1		
Jser variables fo	r Macronix			
Variable	Value			
TEMP	%USERPROFILE%\AppData\Local\Temp			
TMP	%USERPROFILE%\AppData\Local\Temp			
	New Edit Delete	New Us	er Variable	
ystem variables Variable	Value	Variable	e <u>n</u> ame:	XIL_IMPACT_SKIPIDCODECHECK
ComSpec	C:\Windows\system32\cmd.exe			
FP_NO_HOST_	C NO	Variable	e value:	1
NUMBER_OF_P	2		-	
OS	Windows_NT   Windows_NT  Edit  Delete			OK Cancel
	OK Cancel			

Figure 3-4: Environment Variables Window and New User Variable Window

![](_page_5_Picture_0.jpeg)

### 4. Serial Flash Selection inside the Xilinx iMPACT Tool

Macronix serial flash part numbers are not listed in the iMPACT tool. When prompted by the iMPACT tool to select a serial flash device (Figure 4-1), choose the N25Q part number that matches the density of the Macronix serial flash being used. This method will work for densities from 32Mb through 256Mb. Currently there is no 512Mb selection within the iMPACT tool that is compatible with Macronix 512Mb serial flash. If only 256Mb or less of the 512Mb memory array will be programmed, selecting the 256Mb option as shown in Figure 4-1 should work.

🐉 Select Attached SPI/BPI			
Select the PROM attached to FPGA:			
SPI PROM	~	N25Q256	~
Data Width:		1	~
ОК		Cancel	

Figure 4-1: Serial Flash Selection

#### 5. Summary

- a) If using Quad I/O mode (x4 bus width), set the QE bit prior to installing the serial flash into the system or use a Macronix 73 series serial flash that has QE preset to '1'.
- b) Set the operating system environment variable **XIL\_IMPACT\_SKIPIDCODECHECK=1** to avoid the "ID Check failed" error message.
- c) To program a Macronix serial flash using the Xilinx iMPACT tool, select the N25Q part number that matches the density of the Macronix serial flash being used.

#### 6. Revision History

#### Table 6-1: Revision History

Revision	Description	Page	Date
REV. 1	Initial Release.	ALL	June 27, 2013
REV. 2		1, 4, 6, 7	September 30, 2013

![](_page_6_Picture_0.jpeg)

Except for customized products which have been expressly identified in the applicable agreement, Macronix's products are designed, developed, and/or manufactured for ordinary business, industrial, personal, and/or household applications only, and not for use in any applications which may, directly or indirectly, cause death, personal injury, or severe property damages. In the event Macronix products are used in contradicted to their target usage above, the buyer shall take any and all actions to ensure said Macronix's product qualified for its actual use in accordance with the applicable laws and regulations; and Macronix as well as it's suppliers and/or distributors shall be released from any and all liability arisen therefrom.

Copyright© Macronix International Co., Ltd. 2013. All rights reserved, including the trademarks and tradename thereof, such as Macronix, MXIC, MXIC Logo, MX Logo, Integrated Solutions Provider, NBit, Nbit, NBiit, Macronix NBit, eLiteFlash, HybridNVM, HybridFlash, XtraROM, Phines, KH Logo, BE-SONOS, KSMC, Kingtech, MXSMIO, Macronix vEE, Macronix MAP, Rich Au-dio, Rich Book, Rich TV, and FitCAM. The names and brands of third party referred thereto (if any) are for identification purposes only.

Xilinx and Xilinx iMPACT are trademarks of Xilinx in the United States and other countries.

For the contact and order information, please visit Macronix's Web site at: http://www.macronix.com