

## Introduction

Thank you for participating in the Spartan®-6 FPGA Engineering Sample Program. As part of this program, we are pleased to provide to you engineering samples of the device listed in [Table 1](#). Although Xilinx has made every effort to ensure the highest possible quality, this device is subject to the limitations described in the following errata.

## Device

These errata apply to the Spartan-6 device shown in [Table 1](#).

*Table 1: Device Affected by These Errata*

Device	JTAG ID (Revision Code)
XC6SLX16-2CSG324CES	1

## Hardware Errata Details

This section provides a detailed description of each hardware issue known at the release time of this document.

### IODELAY2

In the devices listed in [Table 1](#), the IODELAY2 block can experience late data edge delays, early data edge delays, and single data bit corruption. MCB interfaces are not affected by the IODELAY2 errata.

#### ***Late Data Edge Delay in IDELAY and ODELAY Modes***

The IODELAY2 block can add up to 350 ps of delay on the rising or falling edge transitions when the IDELAY\_VALUE or ODELAY\_VALUE is 4 or higher for all IDELAY\_TYPE settings or when used as output delay. This behavior can be present at all data rates and should be included in system timing margin analysis.

#### ***Early Data Edge Delay in ODELAY Mode***

The IODELAY2 block used in the ODELAY mode can generate a data edge up to 350 ps early on the rising or falling edge transitions. This behavior can be present at data rates higher than 533 Mb/s and for all ODELAY\_VALUE settings and should be included in system timing margin analysis.

#### ***Single Data Bit Corruption in IDELAY and ODELAY Modes***

The IODELAY2 block can corrupt a single data bit for all IDELAY\_TYPE settings or when used in ODELAY mode.

#### **Work-arounds**

##### **IDELAY\_TYPE=DEFAULT**

The data rate must not exceed 250 Mb/s to avoid data corruption.

##### **IDELAY\_TYPE=FIXED or VARIABLE\_FROM\_ZERO or When Used in ODELAY Mode**

The IDELAY\_VALUE or ODELAY\_VALUE must not exceed the values in [Table 2](#) to avoid data corruption at the indicated data rate.

Table 2: Maximum IDELAY\_VALUE or ODELAY\_VALUE

Data Rate (Mb/s)	Bit Time (ps)	Maximum DELAY Value
945	1,058	9
800	1,250	14
667	1,499	20
625	1,600	22
533	1,876	28
400	2,500	43
333	3,003	54
266	3,759	72
200	5,000	101
188	5,319	107

**IDELAY\_TYPE=VARIABLE\_FROM\_HALF\_MAX**

The data rate must not exceed 400 Mb/s, the IODELAY2 IOCLK frequency must be equal to the data rate, and the positive increment must not exceed 5 to avoid data corruption.

**IDELAY\_TYPE=DIFF\_PHASE\_DETECTOR**

The data rate must not exceed 400 Mb/s and data to clock skew, including package trace difference, must not exceed 0.15 UI to avoid data corruption.

See [Answer Record 38408](#) for additional information.

**Block RAM****Dual Port Block RAM Address Overlap in READ\_FIRST and Simple Dual Port Mode**

When using the block RAM in True Dual Port (TDP) READ\_FIRST mode or Simple Dual Port (SDP) mode, with different clocks on ports A and B, the user must ensure certain addresses do not occur simultaneously on both ports when both ports are enabled and one port is being written to. Failure to observe this restriction can result in read and/or memory array corruption.

The description is found in the Conflict Avoidance section in v1.2 of [UG383](#), the *Spartan-6 FPGA Block RAM Resources User Guide*.

This description was originally added to the *Spartan-6 FPGA Block RAM Resources User Guide*, v1.1, published 10/28/09. This errata is being provided to highlight this change and ensure that all users are aware of this design restriction. ISE® 12.1 software provides appropriate warnings for possible violations of these restrictions.

This issue will not be fixed in silicon.

**Work-around**

The recommended work-around to avoid memory array corruption issue is to configure the block RAM in WRITE\_FIRST mode. WRITE\_FIRST mode is available in block RAMs configured in TDP mode in all ISE software versions. WRITE\_FIRST mode is available in block RAMs configured in SDP mode from ISE v12.3 and later.

See [Answer Record 34533](#).

## 9K Simple Dual Port Block RAM Width Restriction

The Spartan-6 FPGA RAMB8BWER in Simple Dual Port (SDP) mode (RAM\_MODE=SDP) only supports the 36-bit data width on both ports. Failure to set both ports to 36 bits (DATA\_WIDTH\_A=36, DATA\_WIDTH\_B=36) can result in data corruption.

The description is found in the Possible Configurations section in v1.2 of [UG383](#), *the Spartan-6 FPGA Block RAM Resources User Guide*.

This description was originally added to the *Spartan-6 FPGA Block RAM Resources User Guide*, v1.2, published 02/23/10. This errata is being provided to highlight this change and ensure that all users are aware of this design restriction. ISE 12.1 software provides appropriate warnings for possible violations of these restrictions.

This issue will not be fixed in silicon.

### Work-around

See [Answer Record 34541](#).

## 9K Block RAM Initialization

Block RAM used in the 9K mode (RAMB8BWER) can fail to initialize user data or default values during configuration in the devices listed in [Table 1](#).

This issue will not be fixed in the devices listed in [Table 1](#).

### Work-arounds

Either use 18K block RAM or write to the 9K block RAM to initialize it after configuration.

See [Answer Record 39999](#).

## Block RAM Byte-Write Enable Hold Time

The block RAM byte-write enable input can have a positive hold time in the device listed in [Table 1](#).

### Work-around

Adding additional delay to the write enable input on the block RAM is recommended. Do not place the write-enable source in the CLB adjacent to the block RAM.

## Memory Controller Block (MCB)

### MCB Calibration

In the device listed in [Table 1](#), for designs using Calibrated Input Termination, use the following CSG324 pin locations for the RZQ reference resistor: MCB Bank 1 – pin M13, MCB Bank 3 – pin C2.

### MCB and Suspend

In the device listed in [Table 1](#), the MCB does not support the self-refresh mode of the external memory during FPGA Suspend.

### MCB Address Bus Hold Time

In the device listed in [Table 1](#), some bits of the MCB address bus (mcbx\_dram\_addr) can violate the input hold time ( $t_{IH}$ ) specification of the memory device.

### Work-around

See [Answer Record 34089](#).

## DCM Minimum Frequency

The Digital Clock Manager (DCM\_SP or DCM\_CLKGEN) minimum frequency does not meet the data sheet specifications in the device listed in [Table 1](#). The following specifications deviate from the data sheet:

- CLKIN\_FREQ\_DLL Min: 50 MHz
- CLKOUT\_FREQ\_CLK0 Min: 50 MHz
- CLKOUT\_FREQ\_CLK90 Min: 50 MHz
- CLKOUT\_FREQ\_2X Min: 100 MHz
- CLKOUT\_FREQ\_DV Min: 3.125 MHz
- CLKIN\_FREQ\_FX Min: 1.6 MHz
- CLKOUT\_FREQ\_FX Min: 50 MHz
- CLKOUT\_FREQ\_FXDV: 1.6 MHz

## BUFPLL LOCK Output

In the device listed in [Table 1](#), the BUFPLL LOCK output might stay High when the PLL\_BASE LOCKED signal is Low. As a result, the timing of the SERDESSTROBE signal might change after the PLL has been reset.

### Work-around

Any application that performs a training, framing, or Bitflip function on the incoming data should be reinitialized following a PLL reset to ensure correct data reception.

## Device DNA

Device DNA is not supported in the device listed in [Table 1](#). Do not use this feature.

## IOB DDR Mode

DDR mode is not supported in Banks 0 and 2 (top and bottom) in the device listed in [Table 1](#).

## Configuration Readback

Readback is not supported in the device listed in [Table 1](#). Do not select the verify or readback options in the iMPACT tool or enable post-configuration CRC.

See [Answer Record 35055](#) for more information.

## Operational Guidelines

### *Design Software Requirements*

The device listed in [Table 1](#), unless otherwise specified, requires the following Xilinx development software installation.

Speed specification v1.01, Xilinx® ISE Design Suite 11.3, but no later than speed specification v1.12 and Xilinx ISE Design Suite 12.3 (see [Answer Record 39545](#)).

## Operating Conditions Required when Using I/O Delay Variable Mode

In the device listed in Table 1, when using I/O Delay Variable Mode, the operating conditions must be:

- $V_{CCINT} = 1.20V$  to  $1.26V$
- Junction temperature ( $T_j$ ) =  $25^{\circ}C$  to  $85^{\circ}C$

The I/O delay variable mode (also known as I/O delay calibration and reset) is used when the IODELAY2 CAL or RST are used or when IODELAY2 IDELAY\_TYPE attribute is set to VARIABLE\_FROM\_ZERO, VARIABLE\_FROM\_HALF\_MAX, or DIFF\_PHASE\_DETECTOR.

## Traceability

The XC6SLX16 listed in Table 1 is marked as shown in Figure 1.

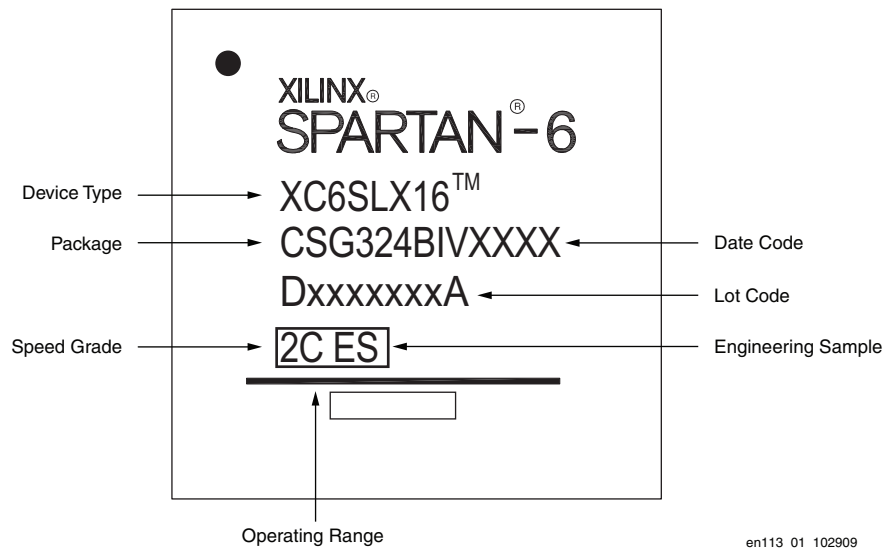


Figure 1: XC6SLX16-2CSG324CES Marking

## Additional Questions or Clarifications

For additional questions regarding these errata, contact Xilinx Technical Support:  
<http://www.xilinx.com/support/clearxpress/websupport.htm> or your Xilinx Sales Representative:  
<http://www.xilinx.com/company/contact.htm>.

## Revision History

Date	Version	Description
07/17/09	1.0	Initial Xilinx release.
09/10/09	1.1	Updated the <a href="#">Memory Controller Block (MCB)</a> section and removed reference to software issues in <a href="#">Answer Record 33130</a> . Removed MCB Auto-Precharge Instructions; this issue will be addressed in software.
10/29/09	1.2	Added <a href="#">MCB and Suspend</a> . Updated <a href="#">Figure 1</a> marking.
02/11/10	1.3	Added <a href="#">MCB Address Bus Hold Time</a> . Updated <a href="#">Design Software Requirements</a> .
05/07/10	1.4	Created a <a href="#">Block RAM</a> section: Added <a href="#">Dual Port Block RAM Address Overlap in READ_FIRST</a> and <a href="#">Simple Dual Port Mode</a> and <a href="#">9K Simple Dual Port Block RAM Width Restriction</a> .
03/18/11	1.5	Added <a href="#">IODELAY2</a> and <a href="#">9K Block RAM Initialization</a> . Updated <a href="#">Dual Port Block RAM Address Overlap in READ_FIRST</a> and <a href="#">Simple Dual Port Mode</a> and <a href="#">Design Software Requirements</a> .

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