

## 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 devices listed in [Table 1](#). Although Xilinx has made every effort to ensure the highest possible quality, these devices are subject to the limitations described in the following errata.

## Devices

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

*Table 1: Devices Affected by These Errata*

Device	JTAG ID (Revision Code)
XC6SLX4 CES9953	0
XC6SLX9 CES9953	0
XC6SLX16 CES9953	3
XC6SLX25 CES9953	0
XC6SLX25T CES9953	0
XC6SLX45 CES9953	3
XC6SLX45T CES9953	3
XC6SLX75 CES9953	0
XC6SLX75T CES9953	0
XC6SLX100 CES9953	0
XC6SLX100T CES9953	0
XC6SLX150 CES9953	3
XC6SLX150T CES9953	3
Packages	All
Speed Grades	-2, -3

## 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
1,050	952	7
1,000	1,000	8
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 the devices listed in [Table 1](#).

#### **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 the devices listed in [Table 1](#).

#### **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](#).

## Memory Controller Block (MCB)

### **MCB Performance**

[DS162](#), *Spartan-6 FPGA Data Sheet: DC and Switching Characteristics* (v1.5) includes new data rate specifications for DDR2 and DDR3 interfaces implemented with the MCB. The new data rates are supported in the Standard MCB

performance mode when operating within the standard  $V_{CCINT}$  recommended operating conditions. In addition, a new Extended MCB performance mode has been introduced with  $V_{CCINT}$  operating conditions that allow the MCB to operate at the originally specified performance.

Table 3: MCB Performance Specification Comparison

Performance Specification	$V_{CCINT}$ Operating Range	DDR2 / DDR3 Performance	
		-2	-3
Original (No Longer Supported)	1.14V – 1.26V	667 Mb/s	800 Mb/s
New (Standard Performance)	1.14V – 1.26V	625 Mb/s	667 Mb/s
New (Extended Performance)	1.2V – 1.26V	667 Mb/s	800 Mb/s

This errata is being provided to highlight this change and ensure that all MCB users are aware of the new performance modes and specifications. The ISE 12.2 software (with MIG 3.5) will provide support for selection and timing validation of the new Standard and Extended MCB performance modes. Prior to the ISE 12.2 software release, these modes can be used by adhering to the correct  $V_{CCINT}$  range and ensuring that MIG tool selections are made in compliance with the new performance specifications.

[Answer Record 35818](#) contains additional information.

## Configuration

### ***BPI Configuration Not Supported in LX25/T Device***

Master BPI mode for configuration is not supported in the XC6SLX25 and XC6SLX25T devices listed in [Table 1](#). The other devices in [Table 1](#) that support Master BPI configuration are not affected.

See [Answer Record 36521](#) for additional information.

This issue will not be fixed in the XC6SLX25 and XC6SLX25T devices listed in [Table 1](#).

#### **Work-around**

Alternative configuration modes include Master SelectMAP mode with a Xilinx Platform Flash PROM or Master SPI mode, including x4 mode with a quad SPI Flash.

### ***16-Bit SelectMAP Configuration Maximum CCLK Frequency for LX100/T Devices***

The maximum CCLK configuration frequency has been revised from 40 MHz to 35 MHz for 16-bit-wide SelectMAP mode for the XC6SLX100/T devices listed in [Table 1](#). SelectMAP mode is also known as slave parallel or BPI mode. The parameters affected are  $F_{SMCK}$  for slave mode (x16 only) and  $F_{MCK}$  for master mode (SelectMAP/BPI x16 only). This change is included in [DS162](#), *Spartan-6 FPGA Data Sheet: DC and Switching Characteristics*, v1.10, November 4, 2010. All designs using 16-bit SelectMAP in the XC6SLX100/T devices should use a configuration frequency of less than 35 MHz. No software changes are associated with this revision.

See [Answer Record 38733](#) for additional information.

### ***Configuration Readback When Using 9K Block RAM***

Configuration readback can corrupt 9K block RAM (RAMB8BWER) data. Configuration readback (including iMPACT Verify) is not supported when 9K block RAM is used in the devices listed in [Table 1](#). However, readback CRC (POST\_CRC), which is typically used for SEU detection, is supported.

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

#### **Work-around**

Use 18K block RAM if configuration readback will be used.

See [Answer Record 39977](#).

## SCD9953 Test Conditions

The devices listed in [Table 1](#) support the Industrial temperature range ( $T_j = -40^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$ ), unless otherwise specified.

## Operational Guidelines

### Design Software Requirements

The devices listed in [Table 1](#), unless otherwise specified, require the following Xilinx development software installation:

- Speed specification v1.08 (or later), Xilinx ISE Design Suite 12.1 (or later).

## Traceability

The XC6SLX45T is marked as shown in [Figure 1](#). The other devices in [Table 1](#) are marked similarly.

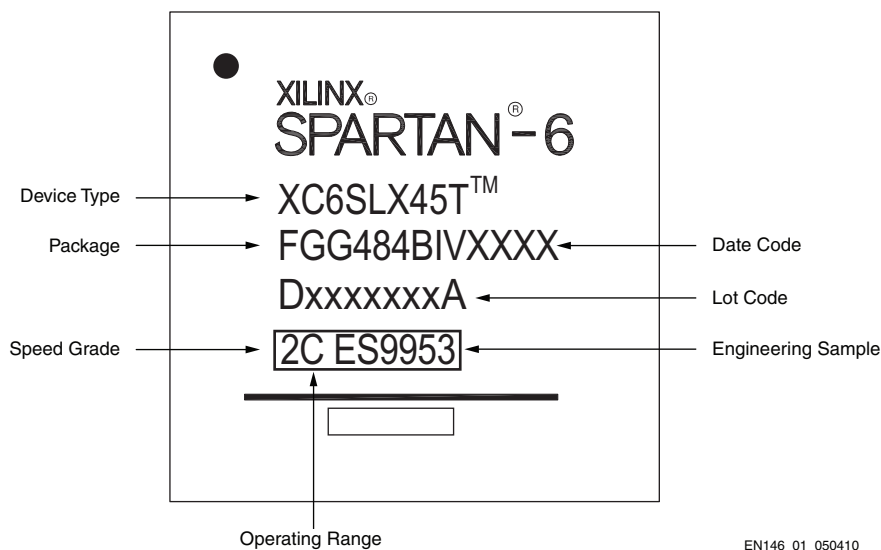


Figure 1: Example Device Top Mark

## 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
05/06/10	1.0	Initial Xilinx release under limited distribution.
06/07/10	1.1	Added <a href="#">Memory Controller Block (MCB)</a> errata.
06/16/10	1.1.1	Published to <a href="http://www.xilinx.com">http://www.xilinx.com</a> .
07/02/10	1.2	Added <a href="#">BPI Configuration Not Supported in LX25/T Device</a> .
03/18/11	1.3	Added <a href="#">IODELAY2</a> , <a href="#">9K Block RAM Initialization</a> , <a href="#">16-Bit SelectMAP Configuration Maximum CCLK Frequency for LX100/T Devices</a> , and <a href="#">Configuration Readback When Using 9K Block RAM</a> . Updated <a href="#">Dual Port Block RAM Address Overlap in READ_FIRST and Simple Dual Port Mode</a> .

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