Avnet
PicoZed 7010/7020
Revision C
Errata

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Avnet
Released
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    Rev 1.1   08/23/2017

1   Introduction

Thank you for your interest in the Avnet PicoZed System-On-Modules. Although Avnet has made every effort to ensure the highest possible quality, these kits and associated software are subject to the limitations described in this errata notification.

Be aware that any of the optional workarounds requiring physical modifications to the board are done at the User's own risk, and Avnet is not liable for poorly performed rework.

2   Identifying Affected Modules

The modules affected by these errata can be identified by the Revision of the PicoZed System-On-Module. The revision of the PicoZed System-On-Module can be found on the bottom side of the PCB board. The affected PCB boards are the PicoZed 7015 / 7030 Revision C, identified as PCB part number "**Z7PZP-Z70xx-PCB-C**" and the BOM Revision Part Number, "**REVCxx**", where the 'xx' is the revision of the BOM on the module.

Figure 1 – Identifying PicoZed 7015/7030 for this Errata

3 Errata

3.1 eMMC Read Errors at Startup and Cold Temperatures When Using High-Speed Mode

Applications Affected

All PicoZed SOM designs that access the eMMC in the default high-speed mode at startup or in a cold environment may experience readback failures. For example, using the eMMC as the secondary boot source for booting Linux may encounter a readback error when U-boot attempts to read back the image.ub from the eMMC. Approximately 25% of all PicoZed SOMs are affected. This affects all four densities of PicoZed and both temperature grades, including kits that use these SOMs. The affected part numbers are:

- AES-Z7PZ-7Z010-SOM-G
- AES-Z7PZ-7Z015-SOM-G
- AES-Z7PZ-7Z020-SOM-G
- AES-Z7PZ-7Z030-SOM-G
- AES-Z7PZ-7Z010-SOM-I-G
- AES-Z7PZ-7Z015-SOM-I-G
- AES-Z7PZ-7Z020-SOM-I-G
- AES-Z7PZ-7Z030-SOM-I-G
- AES-Z7PZ-SVDK-G

This issue is discussed in forum topic http://picozed.org/content/picozed-fails-load-os-emmc-low-temp.

Description

By default, several Xilinx applications place the SDIO controller in High-speed Mode (HSM). This mode is described in **Embedded MultiMediaCard(e•MMC) e•MMC/Card Product Standard, (MMCA, 4.41)**. The alternative is referred to by Xilinx as Standard-speed Mode (SSM), while the *MMCA 4.41* refers to this as *Backward-compatible card interface timing*. The timing parameters for both these modes are described in MMCA 4.41 *Figure 64 — Timing diagram: data input/output* as well as *Table 113 — High-speed card interface timing* and *Table 114 — Backward-compatible card interface timing*.

In both modes, the input data is sampled on the rising edge. The difference is the mechanism for outputting data. In SSM, the data is output on the falling edge of the SDIO clock, while in HSM, the data is output on the rising edge of the clock.

Xilinx provides some information about these modes in Answer Record 59999 at http://www.xilinx.com/support/answers/59999.html. This Answer Record provides a design advisory that acknowledges that the Zynq-7000 is not fully compliant with the MMC JEDEC standard 4.41 in that the minimum hold time may be violated. Although the modes described in this document are relevant to the PicoZed issue, the specific issue is not. Avnet has received NDA information from Micron that shows the Micron eMMC used on PicoZed has characterization data showing < 2.0 ns hold time that is required by the Zynq-7000.

The primary failure mode that was discovered in the field was a PetaLinux boot failure during U-boot. Examples of failure messages detected include:

```
sdhci_transfer_data: Error detected in status(0x208000)!
Error reading cluster
** Unable to read file image.ub **
U-Boot-PetaLinux>
```

Or

```
** Unrecognized filesystem type **
U-Boot-PetaLinux>
```

After extensive testing, it was shown that these failures could be eliminated by using SSM at a maximum rate of 25 MHz rather than HSM, which is the default for both U-boot and PetaLinux.

Workaround

PicoZed eMMC must be operated in SDIO SSM at a rate of 25 MHz or less. SSM must be used in both U-boot and PetaLinux. This does not affect the data width; therefore, a data width up to 4 bits is supported.

An example for U-boot and PetaLinux SSM is provided in the updated 2016.2 PetaLinux BSPs that are posted at on the PicoZed Carrier pages:

http://picozed.org/support/design/13076/106

http://picozed.org/support/design/4701/76

PetaLinux Board Support Packages

Compressed PetaLinux BSPs for Avnet Zynq system platforms.

PetaLinux 2016.2 Compressed BSP, z7010

PetaLinux 2016.2 Compressed BSP, z7015

PetaLinux 2016.2 Compressed BSP, z7020

PetaLinux 2016.2 Compressed BSP, z7030

Figure 2 – View on picozed.org

3.2   Extra USB 2.0 Capacitors on SOM

Applications Affected

Currently, there are no known field failures due to this issue. However, it could potentially affect any PicoZed application utilizing the USB 2.0 interface. The affected part numbers are:

- AES-Z7PZ-7Z010-SOM-G
- AES-Z7PZ-7Z015-SOM-G
- AES-Z7PZ-7Z020-SOM-G
- AES-Z7PZ-7Z030-SOM-G
- AES-Z7PZ-7Z010-SOM-I-G
- AES-Z7PZ-7Z015-SOM-I-G
- AES-Z7PZ-7Z020-SOM-I-G
- AES-Z7PZ-7Z030-SOM-I-G
- AES-Z7PZ-SVDK-G

Description

The Microchip USB3320 outlines very specific capacitance guidelines for setting the PHY mode to Host, Device, or OTG. To keep the PicoZed as flexible as possible, the Mode setting capacitors must be placed on the Carrier based on the operating USB mode the user requires. On Rev C, extra bypass capacitors were placed on the JX3 connector that may interfere with this mode setting.
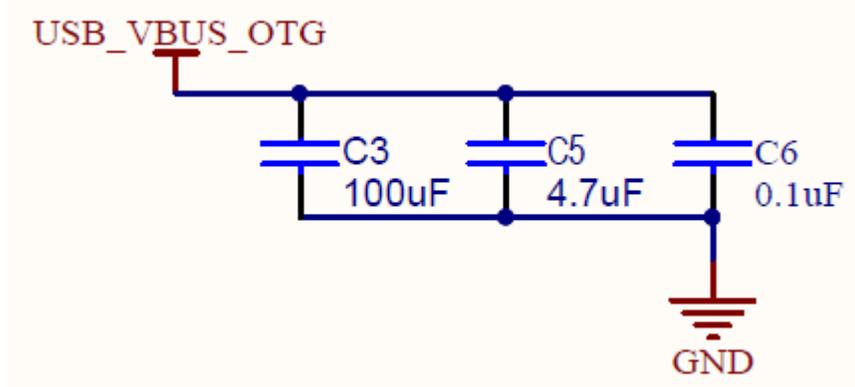

Figure 3 – Extra Caps on PicoZed 7010/7020 Rev C

Workaround

Depopulate C3, C5, and C6 on the SOM.

This fix is implemented on PicoZed 7010/7020 Revision D.

4 New Erratum

Any new erratum found will be posted to the PicoZed website: www.picozed.org

5 Additional Support

For additional support, please review the discussions and post your questions to the PicoZed Forums at

http://picozed.org/forums/picozed-hardware-design

You can also contact your local Avnet FAE.

6 Revision History

Date	Version	Revision
15 Nov 2016	1.0	Initial Version, PicoZed 7010/7020 Rev C, with Item 3.1
22 Aug 2017	1.1	Added Item 3.2, Extra USB 2.0 Capcitors on SOM