

Use of new NOR Flash Parts on phyCORE-PXA270 (PCM-027)

The information in this document is important and must be followed if you are using phyCORE-PXA270 SOMs with order code PCM-027-x1xxxxxxx, or PCM-027-x5xxxxxxx, or corresponding kits (KPCM-...).

Introduction

The NOR Flash parts used on the original design of the PHYTEC phyCORE-PXA270 System-on-Module were supplied by Intel under the name P33 Strata Flash[®]. Later, production rights were transferred to Numonyx and subsequently to Micron. The NOR Flash product name also changed to P33 Axcell[™] Flash.

In addition Numonyx changed the production process for these components by performing a "die shrink" to a state-of-the-art 65nm process. Besides a number of changes to the component characteristics and values as depicted in the data sheet there are also new erratas that apply to the current A1 step product revision which need to be taken into consideration

This applies to the following Flash type:

PC28F256P33xF

One of the most significant changes is the 10 ns longer access time. Besides the changes in access timing our component validation investigation found that the new erratas that have been released for this modified Flash part need to be considered. PHYTEC's research has also shown that the errata called "Flexlock Write Timing" can occur and therefore it is strongly recommended that customers implement the work-around suggested by the component manufacturer Micron.

Micron plans to release a new P33 Flash revision (A2 step) which will fix this errata. Unfortunately market release of this new A2 step has been

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delayed which forces PHYTEC to use the current A1 step component with all its known erratas and the resulting possible impact on customer applications in order to continue to deliver phyCORE-PXA270 SOMs.

The following sections will address the currently known changes identified by PHYTEC and their potential impact on the overall system behavior in conjunction with the phyCORE-PXA270.

Impact of NOR Flash Change on phyCORE-PXA270

1. Verification of configured timing values

The NOR Flash on the phyCORE-PXA270 is accessed via Chip Select Line /CS0. Timing for the memory device selected via /CS0 is done with the help of the MSC0 register. The recommended lower word MSC0 register setting for operation with the new P33 NOR Flash (step A1) part is:
0x12B3.

A complete register function description can be found in the Processor Reference Manual in the following sections:

- 6.5.3 Asynchronous Static Memory Registers
 - 6.5.3.1 Static Memory Control Registers (MSCx)
MSC0 Address 0x48000008

2. Using the JFlash Tool

When using the JFlash Tool, the word mode programming mode must be used. A modified version of the JFlash Tool is available on our FTP site and is also included in the most recent version of the BSP:

<ftp.phytec.de/pub/Products/phyCORE-PXA270/Software/>

3. Implementing the work-around for A1 step errata "Flexlock Write Timing"

Sample source code for implementing this work around in your firmware is available on our FTP server. We also created modified bootloaders which are also available.

PCM-027 Linux:

<ftp://ftp.phytec.de/pub/Products/phyCORE-PXA270/OSELAS/IM590/>

PCM-027 WinCE:

<ftp://ftp.phytec.de/pub/Products/phyCORE-PXA270/wince/IM590/>

Summary and Additional Resources

The information in this document has been compiled by PHYTEC to the best of our knowledge. In addition we recommend checking additional documents provided by Micron/Numonyx related to this Flash part revision.

Furthermore it is strongly recommended to perform in-system validation tests using the specific hardware and software environment of your end application.

A complete library of related P33 NOR Flash datasheets, application and errata notes is available on the following URL (as of the time of creating this TechNote):

<http://numonyx.com/en-US/MemoryProducts/NOR/Pages/P30P33Documents.aspx>

References

Conversion Guide: Numonyx® Axcell™ Flash Memory P33 Stack 256-Mbit/256-Mbit (130nm) to 512-Mbit monolithic (65nm)
Application Note - 309015
Apr 2010

Numonyx® Axcell™ Flash Memory (P33-65nm)
256-Mbit, 512-Mbit (256M/256M)
Datasheet, Order Number: 320003-09
Mar 2010

Marvell PXA27x Processor Developers Manual
MV-TBD-00 Rev. A (November 3, 2006)