



XEMICS

AN8000.10

*XE8000 series:
Guidelines on utilization
and troubleshooting.*

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Introduction

This document concerns all XE8000 devices delivered by XEMICS.

Devices delivered as untested samples may have additional limitations.

Announcing a new limitation

Any person that detects an unexpected limitation or a bug in one of the XE8000 series products should:

- 1) Check if this specific behavior is documented in the up-to-date databook and datasheets that one can find on XEMICS web site at www.xemics.com
- 2) Check if this specific behavior is documented in the up-to-date version of this AN8000.10 that one can find on XEMICS web site at www.xemics.com
- 3) If this limitation or bug is not yet documented, send it via email to hotline@xemics.com with the most precise description, including software example if needed, so that XEMICS' support engineers can reproduce it and isolate it.

As soon as this limitation will be isolated, registered XE8000 developers will be informed via email and this list will be updated.

Limitations, bugs and other information

Function affected: PWM on counters.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: PWM set on 10, 12, 14 and 16 bits will deliver a wrong output when the input is a multiple of 256. Rem: the PWM of the signal DAC of the XE88LC05 is not affected by this problem.
Work-around: Detect when the value to send to the PWM is a multiple of 256 (least significant byte = 00), and add 1 (no carry needed).
Modification planned: Yes

Function affected: Maximal operation speed.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: Maximal operation speed of the processor is 2 MIPS.
Work-around: None.
Modification planned: Not on these products. Future products (XE88LC02, XE88LC04, and XE88LC06) will have 4 MIPS operation.

Function affected: Minimal operation voltage.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: Minimal operation voltage is 2.7 V.
Work-around: None.
Modification planned: Yes

Function affected: ADC precision.
Devices affected: XE88LC01, XE88LC05.
Description of the issue: ADC precision varies with the input signal amplitude. As long as the input signal is within $-\frac{1}{4}$ full scale and $+\frac{1}{4}$ full scale, the noise and linearity of the ADC is better than 16 bits. For signals around a multiple of $\frac{1}{4}$ of full scale, distortion happens that locally limits the linearity. The worst case is for an input signal at $-\frac{1}{2}$ or $+\frac{1}{2}$ of full scale, where this distortion can reach 12 LSB at 16 bits.
Work-around: We have no simple work-around for that limitation, but one can "play" with the offset of the ZoomingADC™ to set the signal out of the distortion areas.
Modification planned: Yes

Function affected: Multiplication of short integers.
Devices affected: CoolRIDE 1.12 C-compiler and earlier.
Description of the issue: Multiplication of short integers with constant -1 sometimes gives wrong results. Example: short int a, b; a = -9; b = -1 * a;
Work-around: Define a variable, set it to -1 , and use it instead of the constant for the operation. Example: short int a, b, minusone; a = -9; minusone = -1; b = minusone * a;
Modification planned: Yes

Function affected: Counters in capture mode.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: Counters in Capture Mode (point 11.3.8 of XE8000 databook) do count the same way as regular Up/Down Counting (point 11.3.7 of XE8000 databook).
Work-around: Before starting Capture Mode, be sure to set all the counter registers, inclusive RegCntA-B. These registers are not reset at Power-On-Reset, and their value at start-up is unknown until you set it according to your needs.
Modification planned: No

Function affected: Hardware stack depth.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: The hardware stack depth in the XE8000 series is 4. This information was not clear in the original XE8000 databook, and the default value for CoolRIDE is 8.
Work-around: Manually set hardware stack depth to 5 ($4 + 1$) in CoolRIDE settings.
Modification planned: Yes, already done for the databook.

Function affected: Interrupts.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: Interleaved interrupts are not handled correctly.
Work-around: See XEMICS application note AN8000.06.
Modification planned: No

Function affected: SFALG.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: The overflow flag is not correctly set after SFALG if SFLAG follows CMP or CMPA.
Work-around: Add a MOVE a, r0 instruction before the SFLAG instruction. Be aware that the first SFALG in an interrupt routine must also be preceded by the same MOVE a, r0 as the last executed instruction is not known.
Modification planned: No

Function affected: Open inputs at power-up creating undue current consumption.
Devices affected: XE88LC01, XE88LC03, and XE88LC05.
Description of the issue: At start-up of the device, all I/O Ports are configured as inputs, without pull-up or pull-down. In this configuration, the input line can float and the input stage can drain significant current (several mA) between Vbat and VSS.
Workaround: Therefore, at the beginning of the program, one must set all unused Ports either as output, or set the corresponding pull-up on, or have an external pull-up (-down). Be aware that on the ProStart, the Port A buttons have pull-downs. Therefore, if you enable the pull-ups of Port A, and have the buttons jumpers set, you will see an additional resistor between Vbat and VSS (roughly 10 kohm). You can suppress this current by suppressing the unused jumpers, or releasing the pull-ups.
Modification planned: Yes

Function affected: RAM initial state.
Devices affected: All.
Description of the issue: The program does not behave the same way in the simulator or emulator as in the chip.
Workaround: This is most often due to variables that are not initialized. In the simulator and in the emulator, all variables are initialized to 0 during program reset. Whereas on the chip, values in the RAM and in the registers without reset are unknown at startup. The best workaround is to initialize any variable before using it. A simpler workaround is to systematically initialize the complete RAM and all registers that have no reset at the beginning of the program execution.
Modification planned: No

Function affected:

General.

Devices affected:

XE88LC05 packaged before March 2000
(see last line on the package to check
packaging date yyyyww).

Description of the issue:

- 1) Unreliable POR
- 2) Unknown POR status
- 3) RESET pin inactive when no clock
- 4) Wrong UART baud rate
- 5) Port B locked in analog mode
- 6) External resistor for RC not stable
- 7) ADC current requirement no correct and linearity limited
- 8) MTP memory checksum is always bad

Workaround:

Use chips packaged more recently.

Modifications planned:

Done

Conclusion

XEMICS is committed in making the best possible devices for its customers. You can help us to improve our devices by providing us with your detailed and constructive comments, whenever you detect an unexpected behavior on our devices, or you would expect another feature that would make the XE8000 device an even better solution to your system.

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APPLICATION NOTE AN8000.10: XE8000 SERIES (GUIDELINES ON UTILISATION & TROUBLESHOOTING)
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