

Early Problem Notification**25 June 2002 Rev. 1.1****Modul: Engineering Samples of the debugCORE-TC1775****PCB:1207.0**Logic Level on 2.5V Bus of the TC1775 B-Step:

Beginning with the B-Step of the TriCORE TC1775, the supply voltage of the bus interface amounts to 2.3 V-2.7 V (2.5 V nominally). An output level V_{OH} of $0.9 \cdot V_{DDP05} = 0.9 \cdot 2.5 \text{ V} = 2.25 \text{ V}$ is generated based on this. This voltage level may be too low for a write access to connected devices.

Detailed Problem Description:

For a TC1775 write access to the connected 3.3 V devices the following formula applies for the bus voltage level:

$$V_{OHTC1775} > V_{IHBaustein}$$

This formula furthermore results in:

$$V_{OHTC1775} = 0.9 \cdot 2.5 \text{ V} = 2.25 \text{ V}$$

(with a maximum bus load of 600 μA)

The following formulas apply for the devices connected to the bus:

$V_{IHFLASH}$	$= 0.7 \cdot 3.3 \text{ V} = 2.31$	(if the supply voltage is 3.3 V)
V_{IHRAM}	$= 2 \text{ V}$	(if the supply voltage is 3.3 V)
$V_{IHCS8900A}$	$= 2.4 \text{ V}$	(if the supply voltage is 3.3 V)

Since in the case of the Flash as well as the Ethernet Controller CS8900A, the conditions of the formula defined above are not met, there can be no guarantee that the write accesses will be correctly executed over the entire temperature range of the devices in question.

Measurements

Measurements of the address line (A2) during an access to the Flash AM29BL162 have shown that the typical value for $V_{OHTC1775}$ at 20°C ranges between 2.4 V and 2.64 V. These meets the voltage requirements at room temperature. The problem could be minimized by raising the nominal supply voltage from 2.5 V up to 2.6 V. However it is important to make sure that the maximum supply voltage tolerance of 2.75 V is not exceeded.

A test of the module in a climate exposure test cabinet (0°C-70°C in a 1 hour sequence) showed that while executing the Ethernet application „climate“ no functional problems occurred over a period of 8 hours.

Solution:

The problem of the bus voltage level can only be eliminated over the entire temperature range by implementing level shifters or 2.5 V memory devices. A redesign of the module will take this into consideration.