July 26, 2011

CN Number: 1102

CN Change Level: Minor

Subject: I/O Effects at Power-Up in RTSX-SU FPGAs

Dear Customer,

Microsemi has observed certain user designs in which outputs without an externally controlled output enable signal may drive low before VCCA and VCCI reach their minimum operational levels. You should note that the internal logic is not guaranteed to be valid under these conditions. It is good design practice to explicitly disable the outputs until the FPGA completes its power-up initialization with the use of an output enable signal.

The behavior manifests itself as an output that drives low for a period of 400 ns to 500 ns when the later power supply in the power-up sequence (either VCCA or VCCI) reaches 1.5 V. For logic expected to be high once the power supplies reach their minimum operational levels, the logic module will produce a low signal before it produces the expected signal.

This behavior does not impact the reliability of the RTSX-SU FPGAs.

In order to prevent this behavior during power-up, Microsemi recommends either of the following:

1. Outputs should be explicitly disabled until the FPGA has completed its power-up initialization. This can be done by using a TRIBUFF macro with its output enable driven low by an input pin.

2. Outputs should be pulled low with an external resistor. For outputs configured with internal pull-up which is active during power-up, the external pull-down resistor has to have lower resistance than the internal pull-up (range from 25-35 Kohm) to drive the outputs low.

In summary, if you are not using an external output enable signal, you should wait for the RTSX-SU FPGA to complete its power-up initialization before expecting valid levels on the outputs. Affected part numbers are listed in Table 1 on page 2.

If you have any questions, please contact Microsemi's ITAR Application Technical Support at soc_tech_itar@microsemi.com.

Regards,

Microsemi Corporation

Table 1 • Affected Part Numbers

RTSX32SU		
RTSX32SU-CC256M	RTSX32SU-CQ84EV	RTSX32SU-CQ208PROTO
RTSX32SU-1CC256M	RTSX32SU-1CQ84EV	RTSX32SU-1CQ208PROTO
RTSX32SU-CC256B	RTSX32SU-CQ84PROTO	RTSX32SU-CQ256B
RTSX32SU-1CC256B	RTSX32SU-1CQ84PROTO	5962-0150805QXC
RTSX32SU-CC256E	RTSX32SU-CQ208B	RTSX32SU-1CQ256B
RTSX32SU-1CC256E	5962-0150805QYC	5962-0150806QXC
RTSX32SU-CC256EV	RTSX32SU-1CQ208B	RTSX32SU-CQ256E
RTSX32SU-1CC256EV	5962-0150806QYC	5962-0150807QXC
RTSX32SU-1CQ84B	RTSX32SU-CQ208E	RTSX32SU-1CQ256E
5962-0150806QZC	5962-0150807QYC	5962-0150808QXC
RTSX32SU-CQ84E	RTSX32SU-1CQ208E	RTSX32SU-CQ256EV
5962-0150807QZC	5962-0150808QYC	RTSX32SU-1CQ256EV
RTSX32SU-1CQ84E	RTSX32SU-CQ208EV	RTSX32SU-CQ256PROTO
5962-0150808QZC	RTSX32SU-1CQ208EV	RTSX32SU-1CQ256PROTO
RTSX72SU		
RTSX72SU-CGS624B	RTSX72SU-1CQ208E	5962-0151508QXC
RTSX72SU-1CGS624B	5962-0151508QYC	RTSX72SU-CQ256EV
RTSX72SU-CGS624E	RTSX72SU-CQ208EV	RTSX72SU-1CQ256EV
RTSX72SU-1CGS624E	RTSX72SU-1CQ208EV	RTSX72SU-CQ256PROTO
RTSX72SU-CGS624EV	RTSX72SU-CQ208PROTO	RTSX72SU-1CQ256PROTO
RTSX72SU-1CGS624EV	RTSX72SU-1CQ208PROTO	RTSX72SU-LG624B
RTSX72SU-CG624PROTO	RTSX72SU-CQ256B	RTSX72SU-1LG624B
RTSX72SU-1CG624PROTO	5962-0151505QXC	RTSX72SU-LG624E
RTSX72SU-CQ208B	RTSX72SU-1CQ256B	RTSX72SU-1LG624E
5962-0151505QYC	5962-0151506QXC	RTSX72SU-LG624EV
RTSX72SU-1CQ208B	RTSX72SU-CQ256E	RTSX72SU-1LG624EV
5962-0151506QYC	5962-0151507QXC	RTSX72SU-LG624PROTO
RTSX72SU-CQ208E	RTSX72SU-1CQ256E	RTSX72SU-1LG624PROTO
5962-0151507QYC		