Microsemi Corporation: CN18014

October 8, 2018

Customer Notification No: CN18014

Change Classification: Minor

Subject
Addendum to PCN1309 and PCN1309A – Synopsys Synplify Pro Software Bug Regarding Safe State Machine Recovery

Description
Microsemi and Synopsys have recently become aware of a scenario that can result in a state machine design not being implemented with logic circuits which force the state machine into a reset state if an illegal state is detected.

Description of the Problem
When a design is synthesized with the one-hot state machine encoding style and includes state machines with only two states, Synplify Pro may not recognize them as state machines. If the state machine is marked for "safe" implementation, and this bug affects the design, then the inferred extra logic that forces a reset during an illegal state condition will not be added. This problem can occur only when *all* of the following conditions are true.

- The design is synthesized with the "safe" encoding style for the state machine (the user has specified *syn_encoding=" safe"*).
- The state machine is instructed to use "onehot" encoding through the *Implementation Options > VHDL setting.*
- The state machine has only two states.
- The state machine does not have a *syn_state_machine="true"* attribute.

Note: Specifying the encoding style through the *syn_encoding* attribute within the code, as in *syn_encoding="safe,onehot"*, does not result in this bug (if the Implementation Options encoding is set to "default").

Method of Identifying an Affected Design
You can verify whether this issue really affected your design by checking if all the following conditions are true for the Synplify project, where the design was synthesized:

- The design has "onehot" selected as the *Default Enum Encoding*.
- The state machine is marked to be implemented with the "safe" attribute.
- The state machine has only two possible states.
- The state machine does not have a *syn_state_machine="true"* attribute.
- The .srr report does not have an 'Encoding state machine X' message.
- The safe state machine logic does not exist.

Action Required
There are four solutions to this problem:

1. Change the *Default Enum Encoding* to be "default" within the Implementation Options.
2. Add the *syn_state_machine="true"* attribute to the state machine signal.
3. Modify the state machine to be implemented as a one-bit toggle flip-flop.
4. Use software version N-2018.03 or later.

Products Affected by this Change
See Appendix A.

Appendix A

Microsemi FPGA Family Names

PolarFire	RTAX-S, RTAX-DSP
SmartFusion2	RTSX-S, RTSX-SU
IGLOO2	Axcelerator
RTG4	eX
Fusion	SX, SX-A
SmartFusion	40MX
IGLOO, IGLOO/E, IGLOO Nano, IGLOO PLUS	42MX
ProASIC3, ProASIC3/E, ProASIC3 Nano, ProASIC3L	3200DX
ProASIC Plus	Act3
A500K	Act2
	Act1

Contact Information

If you have further questions about this subject, contact Microsemi's Technical Support at soc_tech@microsemi.com.

Regards,

Microsemi Corporation

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