Proposed Changes to the PCS sync SM

IEEE P802.3bs 400 Gb/s Ethernet Task Force

January 2016 Atlanta

Mark Gustlin – Xilinx
Phil Sun - Credo

Introduction

- The current PCS synchronization state machine looks for 3 uncorrectable codewords in a row to declare loss of lock
- We now mux two codewords together, it is not clear in the SM how that is handled, do we declare loss of lock if any 3 are uncorrectable, or just 3 from one codeword (A or B)?
- In sun_01_1215_logic the unlock time is shown assuming 3 consecutive uncorrectable codewords from one codeword (A or B). Due to interleaving, burst errors can create uncorrectable codewords in A and B too easily.
  - Counting 3 blocks from A and B is equal to counting 2 blocks from one FEC decoder which results in too short of an unlock time
- The rest of this shows the proposed changes to clarify this, response for comment #s: 68, 5

Proposed New SM

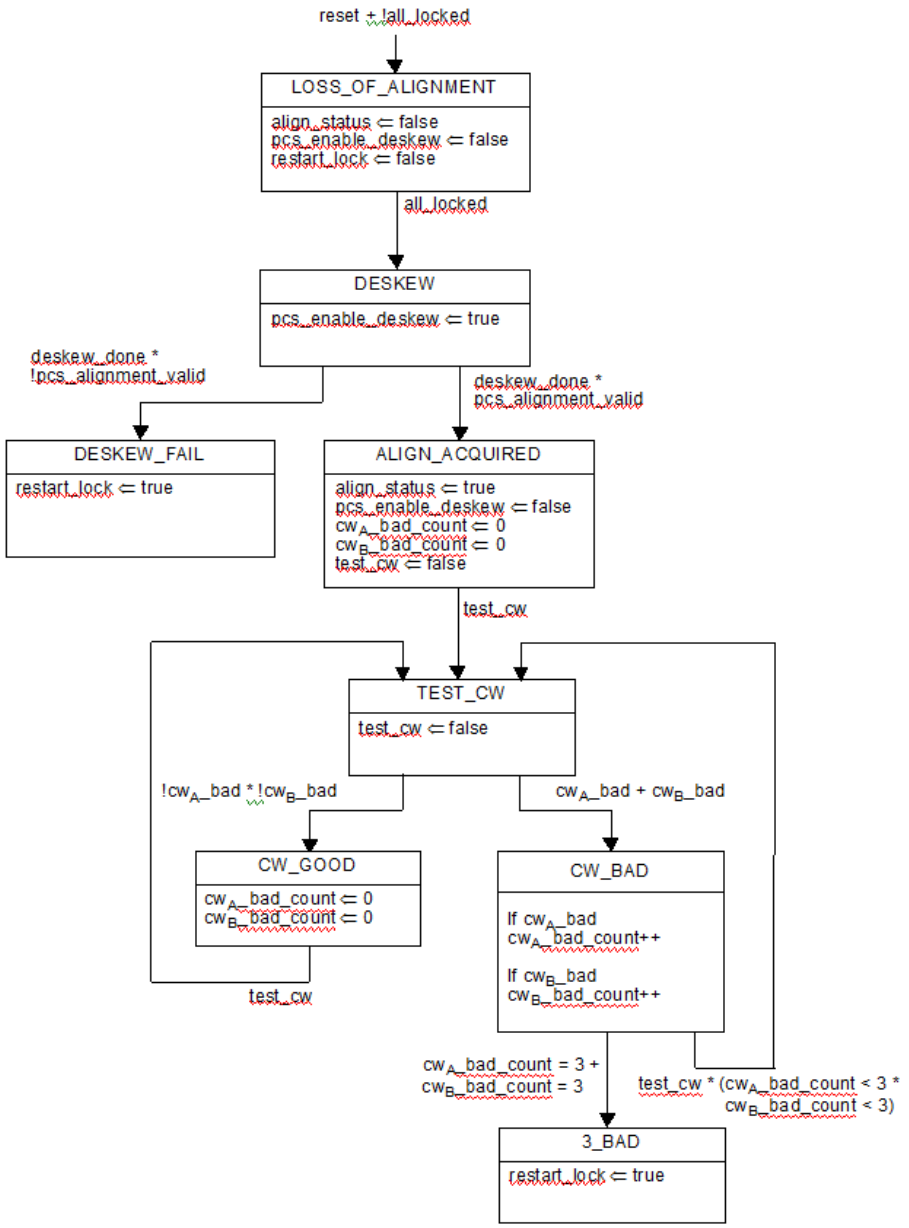

Figure 119–13—PCS synchronization state diagram

Proposed Additional Changes

Additional changes required:

cw_bad

A Boolean variable that is set to true if the Reed-Solomon decoder (see 119.2.5.3) fails to correct the current FEC codeword and is set to false otherwise.

Change to:

cw_A_bad

A Boolean variable that is set to true if the Reed-Solomon decoder (see 119.2.5.3) fails to correct the current FEC $codeword_A$ and is set to false otherwise.

cw_B_bad

A Boolean variable that is set to true if the Reed-Solomon decoder (see 119.2.5.3) fails to correct the current FEC $codeword_B$ and is set to false otherwise.

Proposed Additional Changes

Additional changes required:

cw_bad_count

Counts the number of consecutive uncorrected FEC codewords. This counter is set to zero when an FEC codeword is received and cw_bad is false for that codeword.

Change to:

cw_A_bad_count

Counts the number of consecutive uncorrected FEC codewords for $codeword_A$. This counter is set to zero when $codeword_A$ is received and cw_bad_A is false.

cw_B_bad_count

Counts the number of consecutive uncorrected FEC codewords for $codeword_B$. This counter is set to zero when $codeword_B$ is received and cw_bad_B is false.

Proposed Additional Changes

Additional changes required (page 110, line 12:

From:

Synchronization lock, along with alignment marker lock, are restarted if three FEC codewords in a row are not correctable.

To:

Synchronization lock, along with alignment marker lock, are restarted if three FEC codewords from the same codeword (A or B) in a row are not correctable.

Thanks!