80/81 PCS State Machines for EEE

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Background

- **EEE Baseline adopted in November**
  - **Move that the IEEE P802.3bp Task Force adopt the training and EEE framework as defined by Lo_3bp_02a_1114.pdf pages 2 to 11.**

- **No text or state machines for EEE in Draft 1.1.**
  - **I am proposing changes for the PCS state machines when EEE is supported.**

Entering LPI

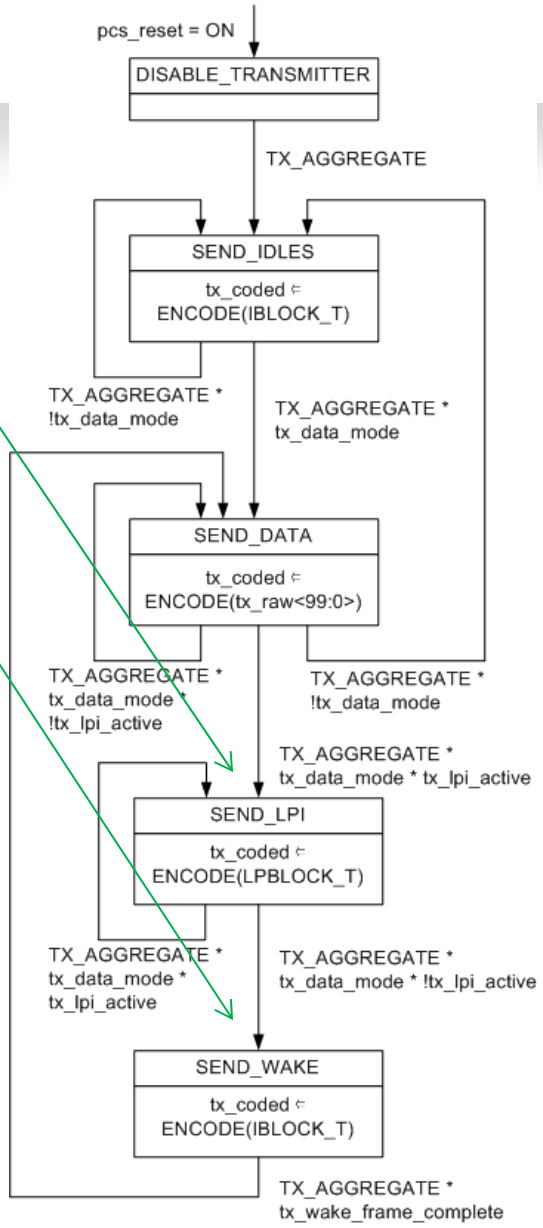
- **Baseline:**
  - If LPI seen on GMII fill remaining bytes in RS frame with LPI symbol. Then send Enter_LPI_RSnumber of RS frame with nothing but LPI symbols.
- **Issue:**
  - As a receiver it will be difficult to distinguish whether a corrupted frame is a full RS frame or a partial RS frame
    - Consider case when partial frame is 1 IDLE followed by LP_IDLE
- **Proposal:**
  - Transmit PCS converts LP_IDLE to IDLE except when full RS frames of LP_IDLE are generated.
    - Define this function in PCS text and ENCODE and definition
    - Simplifies the state machines and LPI enter/exit corner cases.
    - Extensible to include OAM override for LPI
- **80/81 TX State Machine**
  - Encode constant LP_IDLE starting on RS frame alignment until exit from LPI.
- **80/81 RX State Machine**
  - Send constant LP_IDLE to GMII until exit from LPI.

Exiting LPI

- **Baseline:**
  - Send Exit_LPI_RSRS frame with all bytes idles
  - This is the wake frame. Alert pattern not needed.
- **80/81 TX State Machine**
  - Upon detecting non-LP_IDLE at the GMII, send full RS frame of IDLE at the next wake sense window. Then return to normal data.
- **80/81 RX State Machine**
  - Upon detecting WAKE send IDLE to the GMII until the end of the wake sense frame. Then return to normal data.

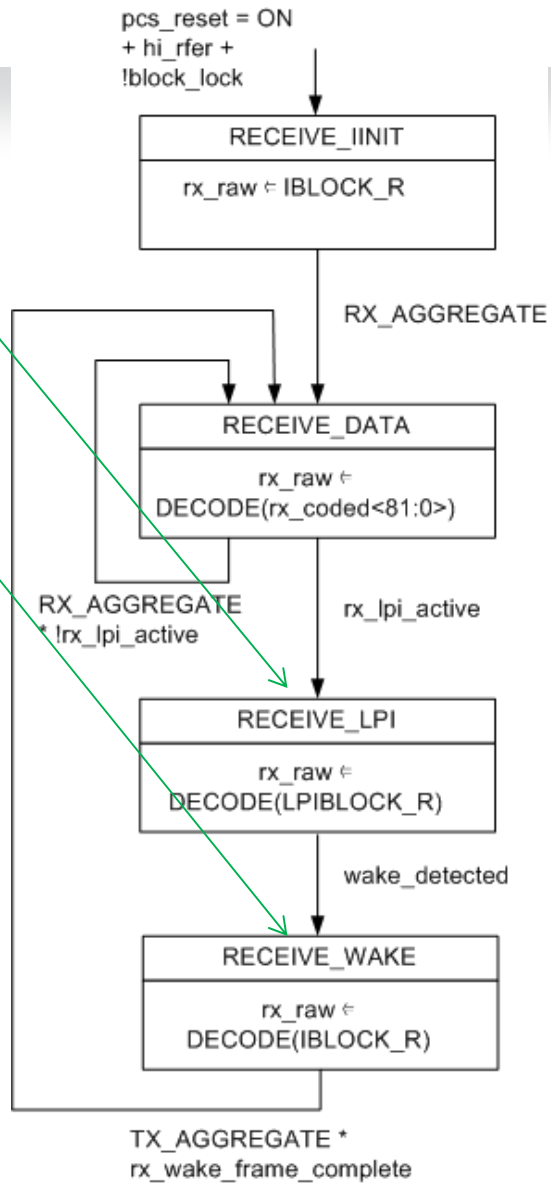
PCS Transmit State Diagram

- Encode constant LP_IDLE starting on RS frame alignment until exit from LPI.
- Upon detecting non-LP_IDLE at the GMII, send full RS frame of IDLE during the next wake sense window. Then return to normal data.
- tx_lpi_active set TRUE on next RS frame if LP_IDLE detected on GMII in last 80/81 block
  - Blocks cases when LPI asserted / deasserted
- tx_lpi_active set FALSE at next wake frame if non- LP_IDLE is detected on GMII in any block
- tx_wake_frame_complete set TRUE at the end of the RS WAKE frame. Set FALSE otherwise.



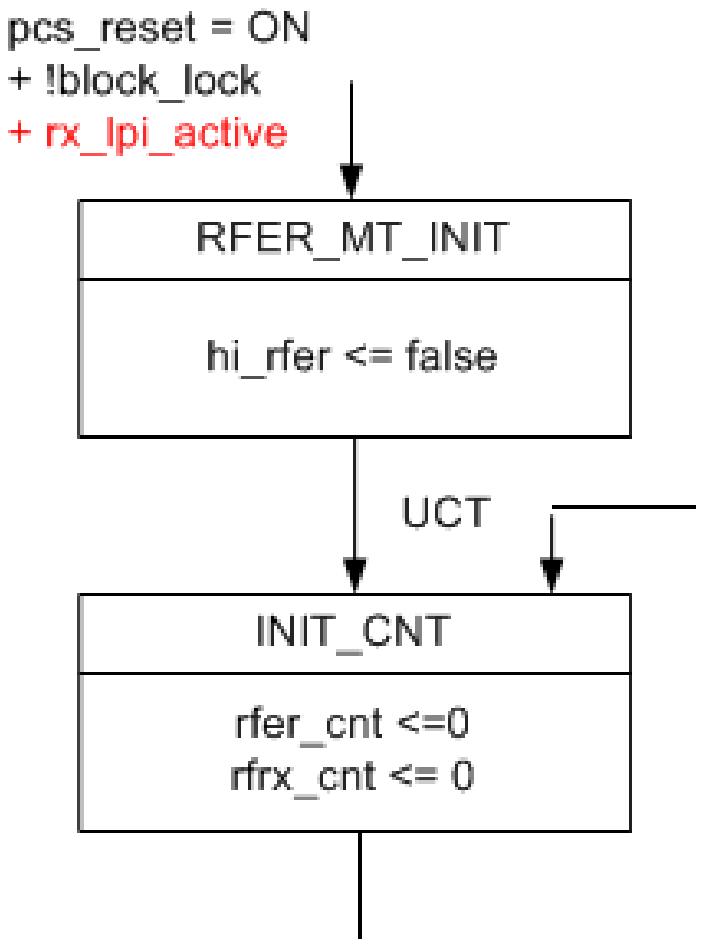
PCS Receive State Diagram

- Send constant LP_IDLE to GMII until exit from LPI.
- Upon wake detection send constant IDLE to GMII until end of WAKE RS frame.
- rx_lpi_active set TRUE upon detection of LP_IDLE. Set FALSE upon wake_detection.
- wake_detected set TRUE upon detection of the WAKE RS frame.
- rx_wake_frame_complete set TRUE at end of WAKE RS frame, otherwise FALSE



RFER Monitor State Diagram

- **Issue:**
  - **Suspend monitor during low power idle**
- **Resolution:**
  - **Hold state machine in RFER_MT_INIT during LPI**



Motions

- **Adopt changes to LP_IDLE encoding, RFER monitor state diagram, PCS Transmit state diagram and PCS Receive state diagram in McClellan_3bp_04_0115.pdf for the case when EEE is supported.**

THANK YOU