Revised Receive State Diagram Figure 24-11a

IEEE 802.3az Task Force
Chicago, Sep 2009
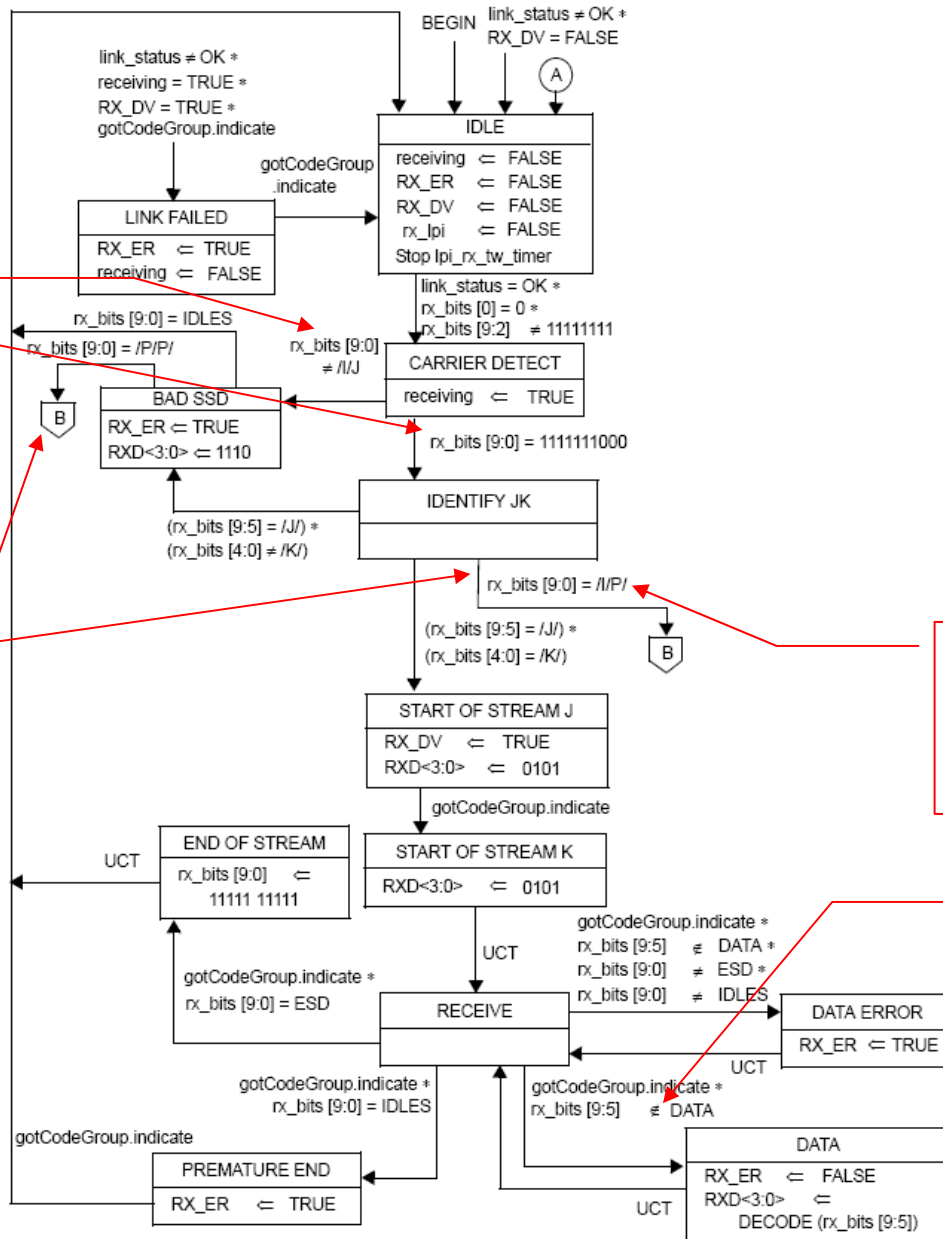
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Objectives

❑ Modify Receive state diagram (Fig 24-11a) of Clause 24 to respond to the following comments:

➢ Comment 147 : Legacy PHY will not take these optional EEE branches.

➢ Comment 148 : There is a typo in the original diagram. "not belongs to" should be changed to "belongs to".

➢ Comment 149 : Why is "rx_bits[9:0] {equal to} /I/J/ " changed to "rx_bits[9:0] {equal to} 1111111000 "?

➢ Comment 151 : A single bit error in a /K/ in the SSD /J/K/ can synthesize the sequence rx_bits[9:0] = /I/P/. In the "classic" 100BASE-X receive state machine, this would be counted as a BAD SSD,

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Receive state diagram

Comment #149
Transition condition is inconsistent

Comment #147
Legacy PHY will not take these optional EEE branches

Comment #151
A single bit error in a /K/ in the SSD /J/K/ can synthesize the sequence rx_bits[9:0] = /I/P/

Comment #148
A typo.
"not belongs to" should be changed to "belongs to"

Figure 24–11a—Receive state diagram, part a

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Revised Receive state diagram

Comment #149
Change bit patterns back to symbols

Comment #147
Enclose the optional EEE branches with dashed box and put a note

Comment #151
Add a new state "WAIT_SLEEP to filter out the single bit error of symbol /K/
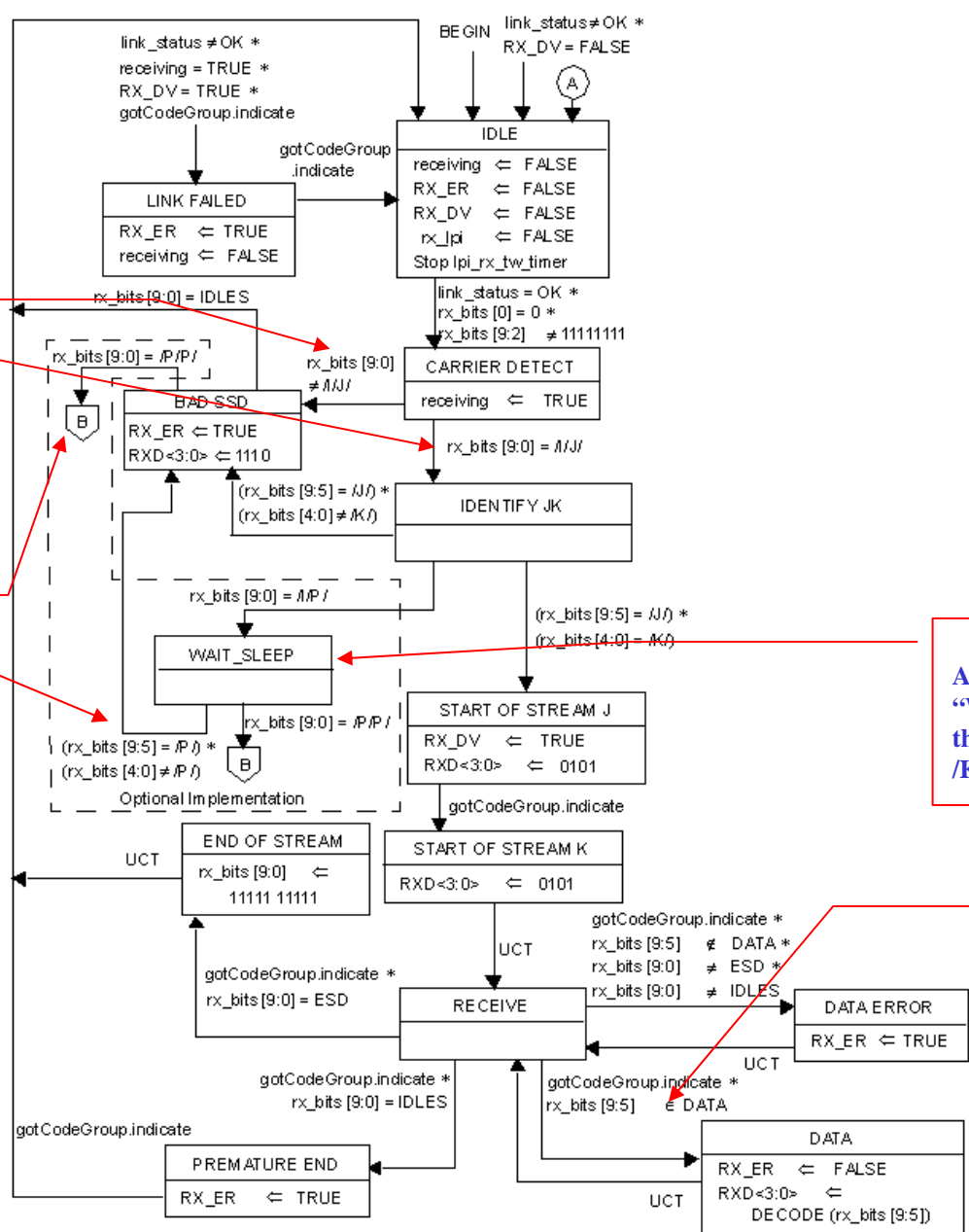
Comment #148
Change "not belongs to" to "belongs to"

BEGIN

link_status ≠ OK *
RX_DV = FALSE

(A)

link_status ≠ OK *
receiving = TRUE *
RX_DV = TRUE *
gotCodeGroup.indicate

gotCodeGroup
.indicate

IDLE
receiving ⇐ FALSE
RX_ER ⇐ FALSE
RX_DV ⇐ FALSE
rx_lpi ⇐ FALSE
Stop lpi_rx_tw_timer

LINK FAILED
RX_ER ⇐ TRUE
receiving ⇐ FALSE

rx_bits [9:0] = IDLES

link_status = OK *
rx_bits [0] = 0 *
rx_bits [9:2] ≠ 11111111

rx_bits [9:0] = /P/P/

rx_bits [9:0]
≠ /I/J/

CARRIER DETECT
receiving ⇐ TRUE

(B)

BAD SSD
RX_ER ⇐ TRUE
RXD<3:0> ⇐ 1110

rx_bits [9:0] = /I/J/

(rx_bits [9:5] = /J/) *
(rx_bits [4:0] ≠ /K/)

IDENTIFY JK

rx_bits [9:0] = /I/P/

(rx_bits [9:5] = /J/) *
(rx_bits [4:0] = /K/)

WAIT_SLEEP

(rx_bits [9:5] = /P/) *
(rx_bits [4:0] ≠ /P/)

(B)

rx_bits [9:0] = /P/P/

START OF STREAM J
RX_DV ⇐ TRUE
RXD<3:0> ⇐ 0101

gotCodeGroup.indicate

Optional Implementation

END OF STREAM
rx_bits [9:0] ⇐
11111 11111

UCT

START OF STREAM K
RXD<3:0> ⇐ 0101

UCT

gotCodeGroup.indicate *
rx_bits [9:5] ∉ DATA *
rx_bits [9:0] ≠ ESD *
rx_bits [9:0] ≠ IDLES

gotCodeGroup.indicate *
rx_bits [9:0] = ESD

RECEIVE

DATA ERROR
RX_ER ⇐ TRUE

UCT

gotCodeGroup.indicate *
rx_bits [9:0] = IDLES

gotCodeGroup.indicate *
rx_bits [9:5] ∈ DATA

gotCodeGroup.indicate

PREMATURE END
RX_ER ⇐ TRUE

DATA
RX_ER ⇐ FALSE
RXD<3:0> ⇐
DECODE (rx_bits [9:5])

UCT

Figure 24–11a—Receive state diagram, part a§

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Summary of Changes

❑ Introduce a new state WAIT_SLEEP between IDENTIFY JK and branch point "B" which goes to START RX_SLEEP

  ➢ The receiver moves to WAIT_SLEEP from the state IDENTIFY JK when a bit pattern 1111100000 is received.

  ➢ It then moves to START RX_SLEEP when receiving two consecutive SLEEP symbols, /P/P/.

  ➢ Any symbol received other than /P/ following a /P/ symbol will lead to the state of BAD SSD

❑ Rewrite the transition condition between CARRIER DETECT and IDENTIFY JK

  ➢ Change "rx_bits[9:0] {equal to} 1111111000" back to "rx_bits[9:0] {equal to} /I/J/"

❑ Enclose all branches and states which are only needed for EEE with dashed box and put a note saying Mandatory to LPI mode

❑ Correct the typo in the branch condition between RECEIVE and DATA

  ➢ Change "rx_bits[9:5] {not belongs to} DATA" to "rx_bits[9:5] {belongs to} DATA"

Thank you !

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