

# IEEE 802.3dg 100BASE-T1L: Downshift: Response to “Downshift State Diagram Issues” contribution from George Zimmerman

Peter Jones – Cisco  
1/20/2026 5:00 PM

## D3.0 issues identified

- [https://www.ieee802.org/3/dg/public/May\\_2025/zimmerman\\_3dg\\_01\\_012026.pdf](https://www.ieee802.org/3/dg/public/May_2025/zimmerman_3dg_01_012026.pdf) identifies several issues in the state diagram including:
  1. Stuck in DS\_INIT state
    - Open ended transition into DS\_INIT on mr\_autoneg\_enable & mr\_ds\_downshift\_enabled
  2. Can never go to DS\_UPSHIFT
    - upshift\_timer is stopped before waiting for a transition...
  3. Can never go to DS\_RESTART
    - restart\_timer is stopped before waiting for a transition...
  4. ds\_downshift\_timer doesn't work – stopped right after started
    - ds\_downshift\_timer\_done is never tested, perhaps “\_running” might be a function of !done.

# D3.0 State Diagram

## 98D.2.5 State diagram

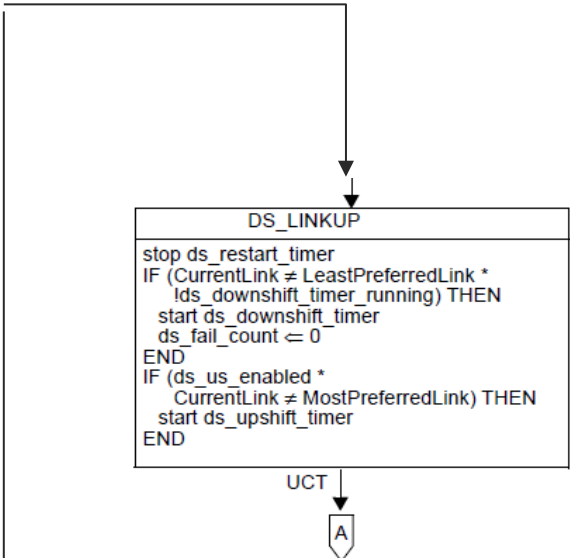
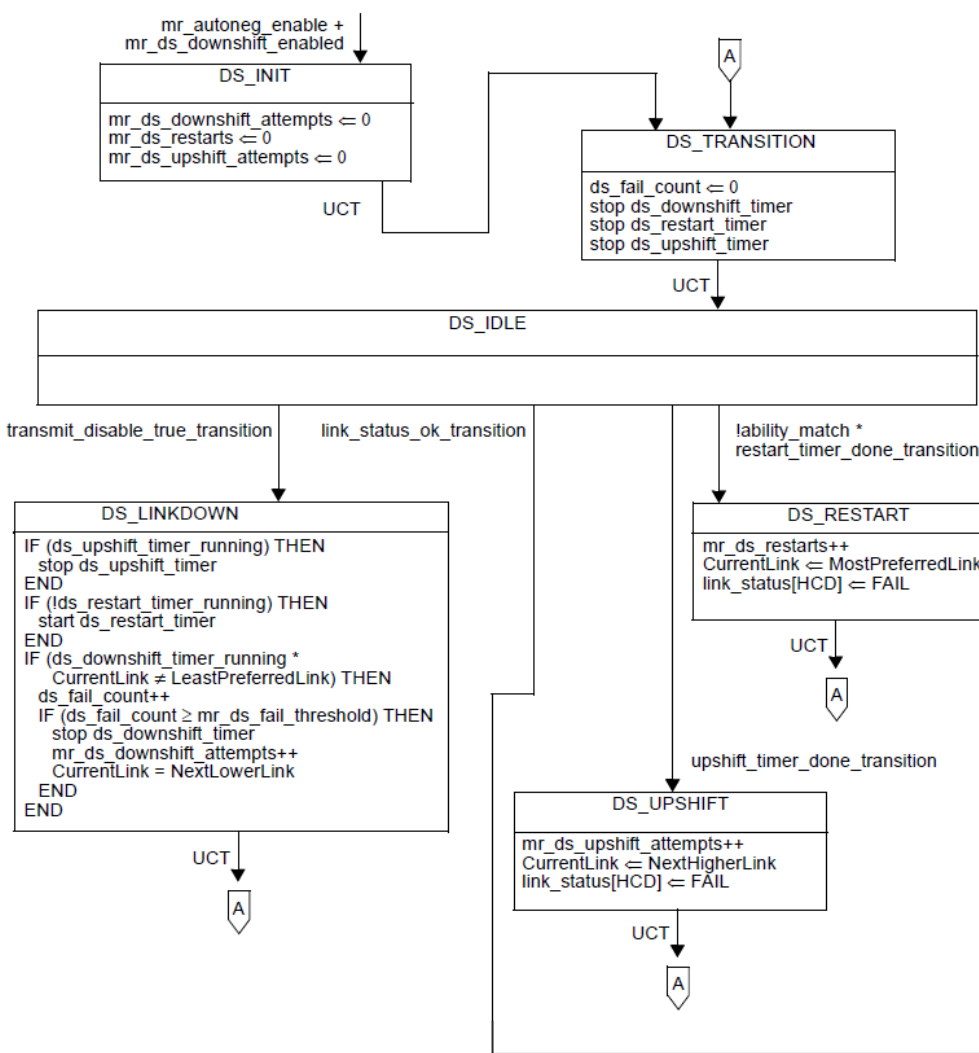


Figure 98D–1—Downshift state diagram

## Item 1 - Stuck in DS\_INIT state

- I agree. I did not remember (or never knew) the special rule for global transitions (21.5.3):

Any open arrow (an arrow with no source block) represents a global transition. Global transitions are evaluated continuously whenever any state is evaluating its exit conditions. When a global transition becomes true, it supersedes all other transitions, including UCT, returning control to the block pointed to by the open arrow.
- This clearly needs to be fixed.

## Items 2, 3, 4 - timers

- I agree.
- I believe the changes are relatively simple, BUT, they need to be validated before we are done.
- We either fix this or pull it out.
- The next slide is an updated state diagram that I believe resolves the items 1-4 and cleans up other sundry issues.
- Decoder
  - additions in ***bold italic***,
  - deletions in ~~strikethrough~~
  - commentary in red-dashed -----

# Proposed changes

Last update:  
1/20/2026 4:58 PM

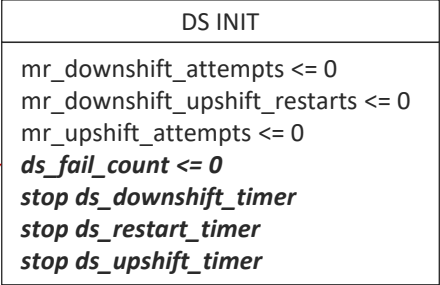
***mr\_autoneg\_enable +  
!mr\_downshift\_enabled***

Figure 98-7: Transition out of "Auto-Negotiation ENABLE"  
link is down, init downshift variables, timers

Downshift enabled: false -> true

Figure 98-7: Exit from Auto-Negotiation ENABLE, AN GOOD, AN GOOD CHECK or NEXT PAGE WAIT -> TRANSMIT DISABLE.

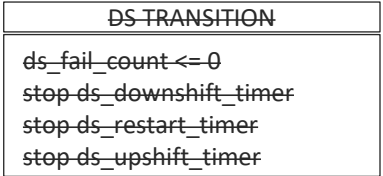
Figure 98-7: TRANSMIT DISABLE > ABILITY DETECT (after break\_link\_timer)



***mr\_downshift\_enabled***

Figure 98-7: transition AN GOOD CHECK -> AN GOOD, (link is up)

Link is up and stable for upshift\_period



UCT

Additions: ***bold italic***  
Deletions: ~~strikethrough~~  
Commentary:

Figure 98-7 in "ABILITY DETECT", link is down, no link codewords with good CRC, so no-one is on the far end

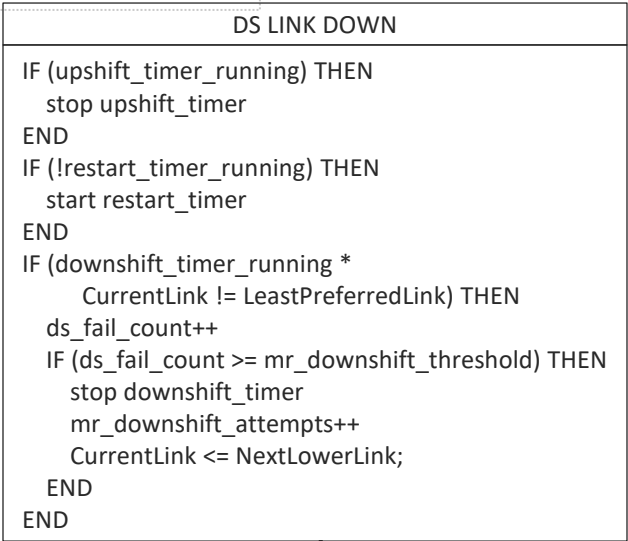


transmit disable true transition

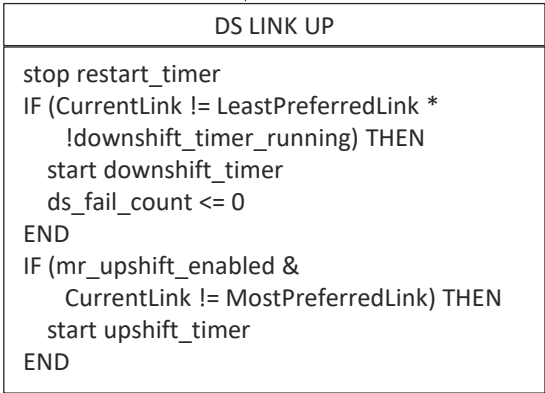
link status ok transition

upshift timer done transition

restart timer done transition \*  
ability\_match=false

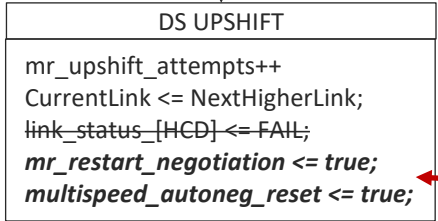


DS IDLE



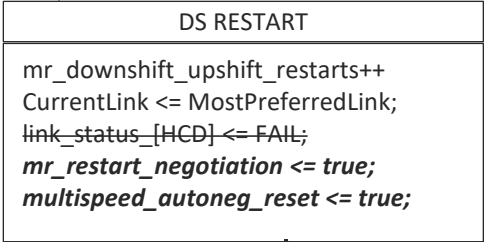
UCT

DS IDLE



UCT

DS IDLE



UCT

Restart Figure 98-7 (Arbitration state diagram) and Figure 98-11(AN speed selection)

# Consensus

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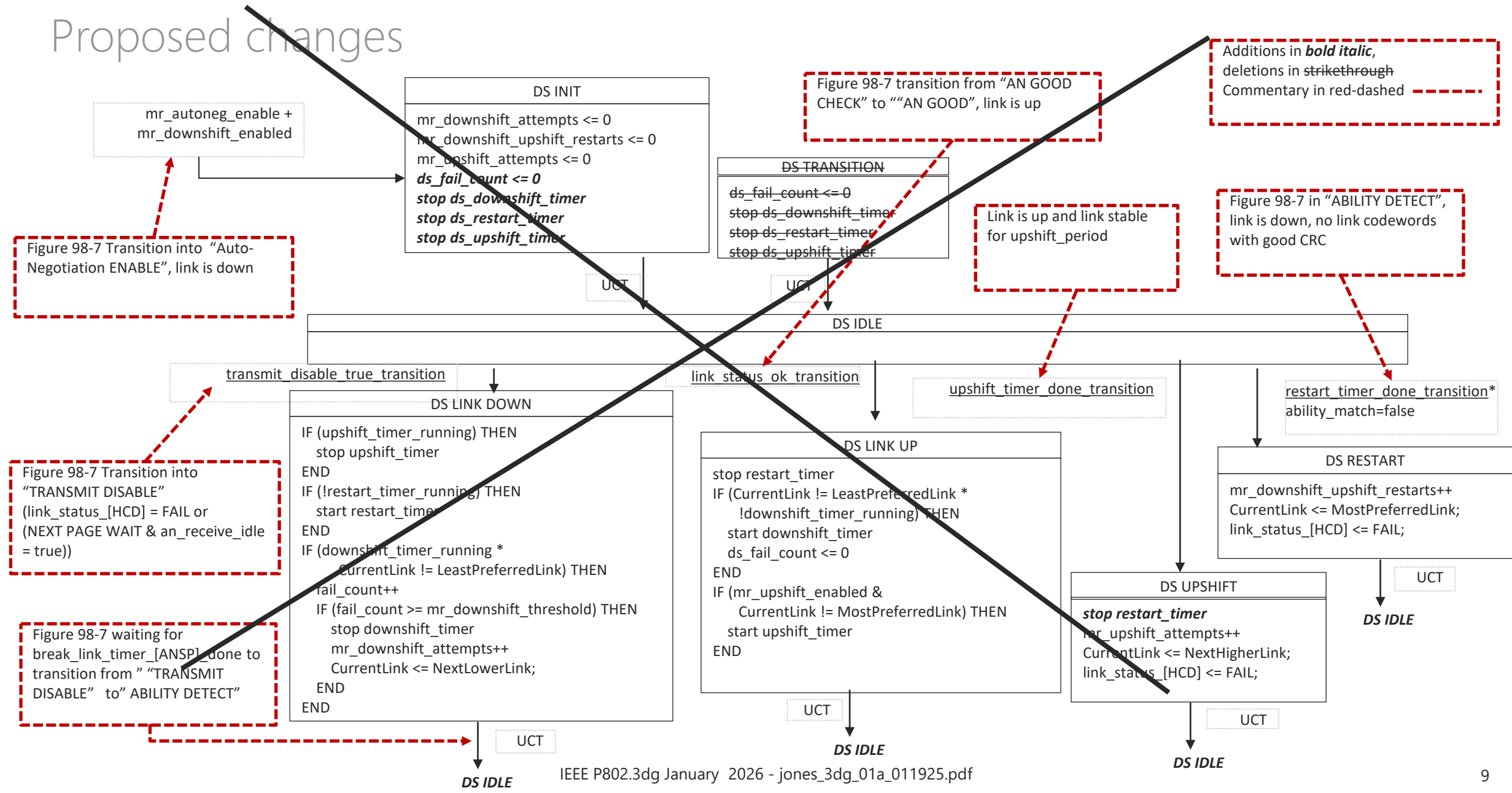
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standards.ieee.org  
Phone: +1 732 981 0060 Fax: +1 732 562 1571  
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State diagram from  
jones\_3dg\_01a\_011925.pdf



# Proposed changes



# Thanks!