

IEEE 802.3dg 100BASE-T1L: Downshift/Upshift

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Background

- Concepts previously presented in:
 - September 2025: [IEEE P802.3dg Downshift/Upshift Proposal & Draft Text](#)
 - July 2025: [Downshift/Upshift \(presentation\)](#), [Proposed draft text](#)
 - May 2024: [IEEE 802.3dg 100BASE-T1L: Downshift - part 2](#)
 - May 2022: [Downshift](#)
- Presentation supports D2.0 comment #255

Downshift/Upshift and BASE-T1L

- More than just 10 vs 100, need to account for “Increased Transmit Level”
- Define list of “link settings” entries most to least preferred
- Actions
 - Unstable link -> move to next less preferred
 - Stable link -> move to next more preferred
 - No signaling -> reset downshift
- Mandatory for 100BASE-T1L
- No changes in clause 98, new Normative Annex 98.D
- Matching changes in clauses 45 and 30

BASE-T1L Link Settings Preference List

- Default
 - 100BASE-T1L Increased Transmit Level
 - 100BASE-T1L
 - 10BASE-T1L Increased Transmit Level
 - 10BASE-T1L
- User can change via clause 45/30.

State diagram variables

PreferredLinkList;

The user configured list of link settings (e.g., technology-dependent PMA and PMA parameters) ordered from most preferred to least preferred.

MostPreferredLink;

The most preferred link settings supported by both peers.

LeastPreferredLink;

The least preferred link settings supported by both peers.

CurrentLink;

The current link settings. Setting this changes mr_adv_ability and potentially other settings (e.g., 10BASE-T1L Transmit Level).

NextHigherLink;

The next link settings above CurrentLink.

NextLowerLink;

The next link settings below CurrentLink.

mr_ds_downshift_enabled

Boolean variable indicating whether downshift is enabled.

mr_ds_upshift_enabled

Boolean variable indicating whether upshift is enabled.

mr_ds_downshift_supported

Boolean variable indicating whether downshift/upshift is supported.

mr_ds_fail_threshold

The number of link failures within the downshift threshold period before downshift is triggered.

Values: Integer number from 1 to 255

mr_ds_period_downshift

The downshift threshold period in seconds.

Values: Integer number from 1 to 255

mr_ds_period_restart

The restart threshold period in seconds.

Values: Integer number from 1 to 255

mr_ds_period_upshift

The upshift threshold period in seconds.

Values: Integer number from 1 to 4095

State diagram timers & counters

ds_downshift_timer

Timer used to evaluate downshift trigger conditions.

Duration: mr_ds_downshift_period seconds.

ds_restart_timer

Timer used to restart downshift/upshift when no valid signaling is detected, i.e., being in Figure 98–7 ABILITY DETECT and not receiving any link codewords with good CRC16.

Duration: break_link_timer_[ANSP] + mr_ds_restart_period.

ds_upshift_timer

Timer used to evaluate upshift trigger conditions.

Duration: mr_ds_link_upshift_period.

mr_ds_downshift_attempts

The number of downshift attempts since auto-negotiation was enabled.

mr_ds_restarts

The number of times downshift was restarted since auto-negotiation was enabled.

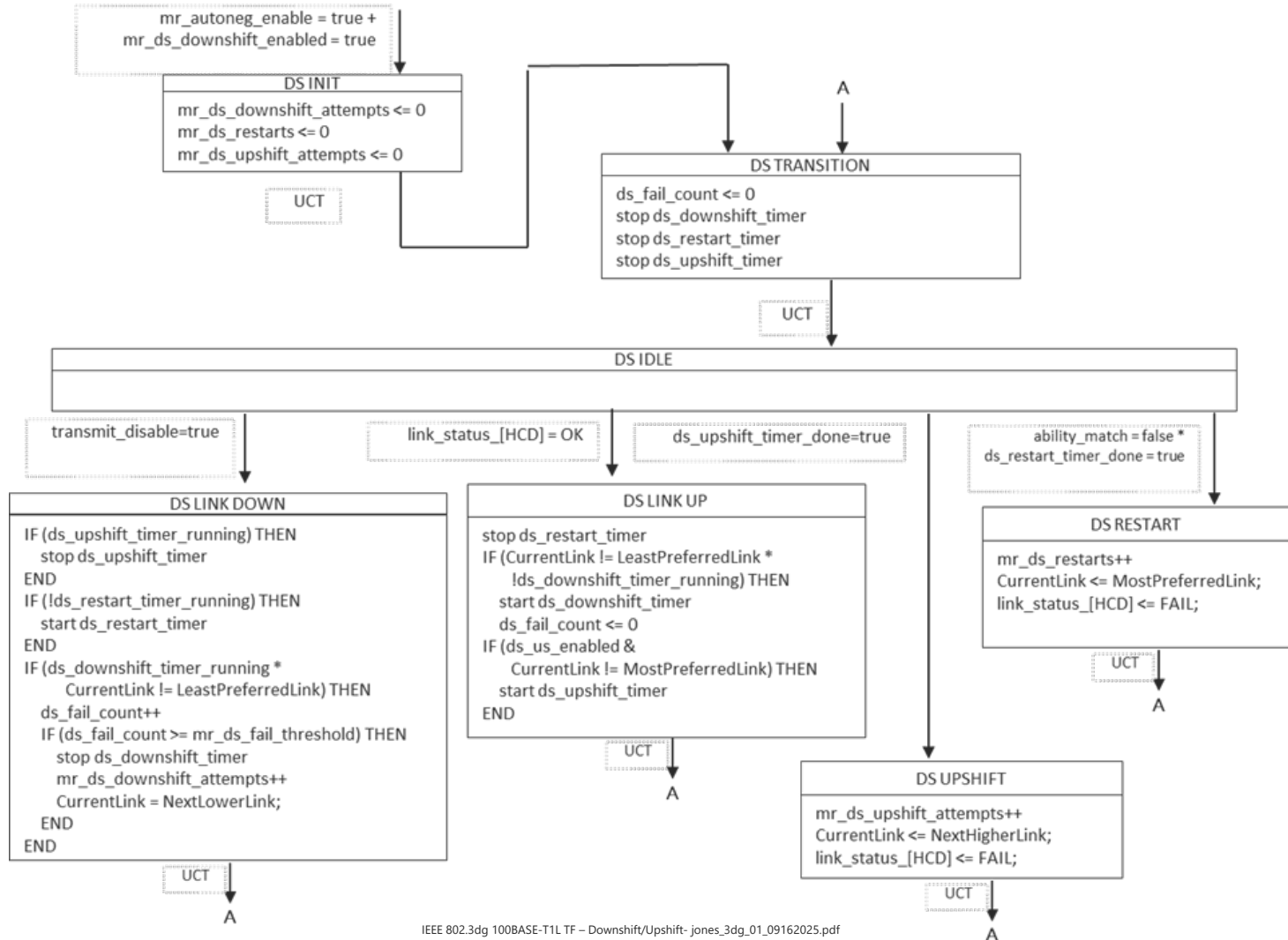
mr_ds_upshift_attempts

The number of upshift attempts since auto-negotiation was enabled.

ds_fail_count

The number of link failures in the last downshift threshold period.

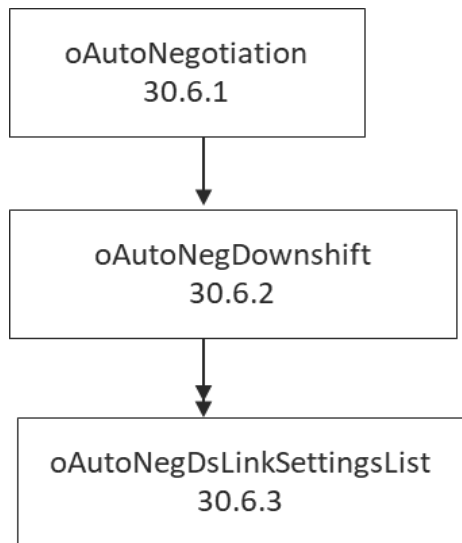
State Diagram



Clause 45 Registers

Register address	Register name	Subclause
7.528	BASE-T1 Downshift Control	45.2.7.28
7.529	BASE-T1 Downshift Status	45.2.7.29
7.530	BASE-T1 Downshift Parameters	45.2.7.30
7.531	BASE-T1 Downshift Restart Parameters	45.2.7.31
7.532	BASE-T1 Upshift Parameters	45.2.7.32
7.533	BASE-T1 Downshift Attempts	45.2.7.33
7.534	BASE-T1 Downshift Restarts	45.2.7.34
7.535	BASE-T1 Upshift Attempts	45.2.7.35
7.536	BASE-T1 Downshift Preference List Entries 0 & 1	45.2.7.36
7.537	BASE-T1 Downshift Preference List Entries 2 & 3	45.2.7.37
7.538 through 7.32767	Reserved	

Clause 30 Containment & MO Classes



Name			Other packages	Auto-Negotiation Downshift package (optional)
oAutoNegDownshift managed object class (30.6.2)				
aAutoNegDownshiftSupported	ATTRIBUTE	GET		X
aAutoNegDownshiftControl	ATTRIBUTE	GET-SET		X
aAutoNegUpshiftControl	ATTRIBUTE	GET-SET		X
aAutoNegDownshiftThreshold	ATTRIBUTE	GET-SET		X
aAutoNegDownshiftPeriod	ATTRIBUTE	GET-SET		X
aAutoNegDownshiftRestartPeriod	ATTRIBUTE	GET-SET		X
aAutoNegUpshiftPeriod	ATTRIBUTE	GET-SET		X
aAutoNegDownshiftAttempts	ATTRIBUTE	GET		X
aAutoNegDownshiftRestarts	ATTRIBUTE	GET		X
aAutoNegUpshiftAttempts	ATTRIBUTE	GET		X
oAutoNegDsLinkSettingsList managed object class (30.6.3)				
aAutoNegDsLinkSettingsEntry	ATTRIBUTE	GET-SET		X

Proposed resolution for #255

- Make changes as per jones_3dg_august_2025_01.pdf pages 7 to 22.

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Consensus

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Thanks!