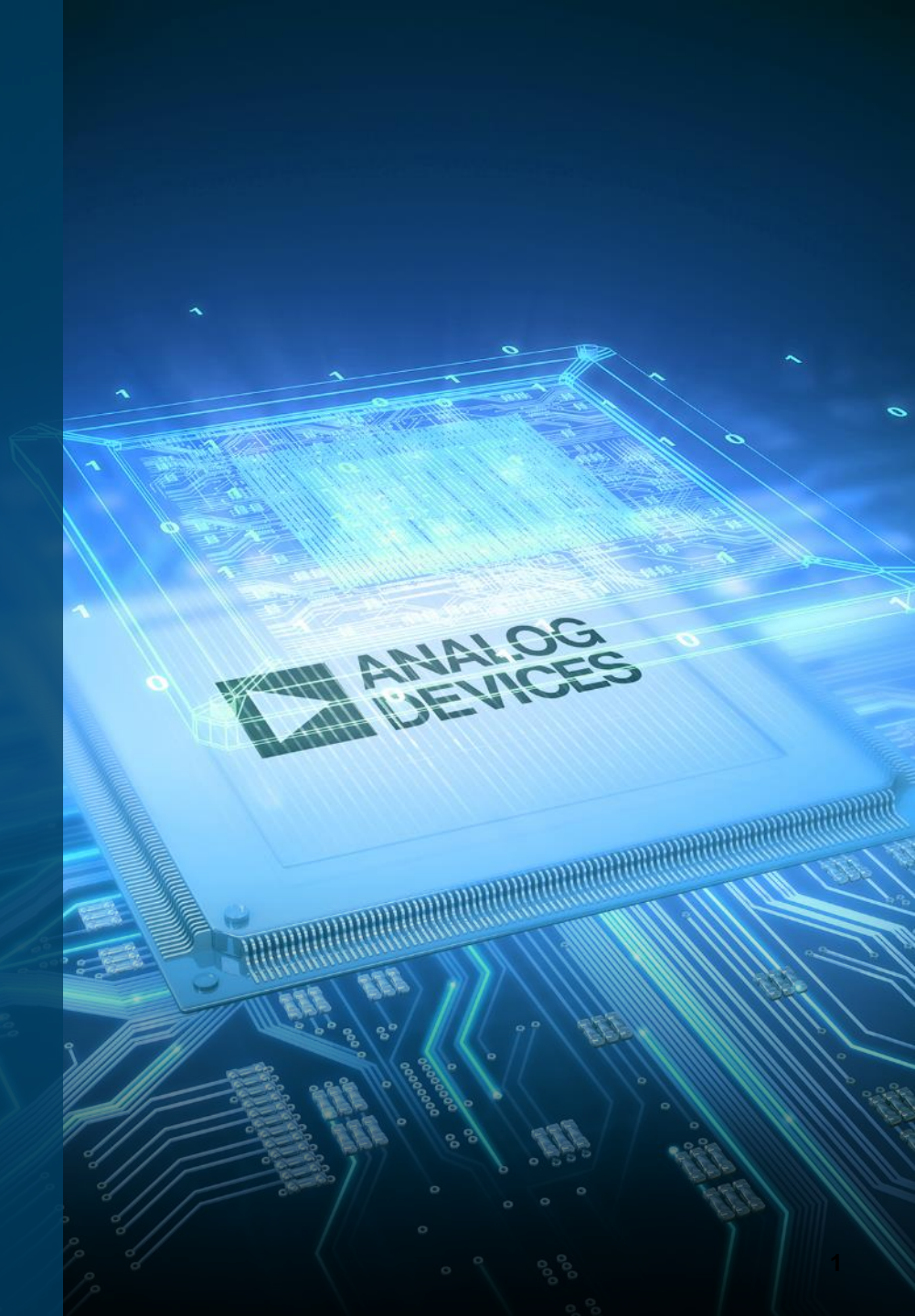




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Proposed resolution for Comments 477,478,583 relating to Fast Startup of a T1L PHY

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Supporters

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- Niall Fitzgerald (Acuitas Silicon)
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Background

- http://www.ieee802.org/3/10SPE/public/Sept2016_Interim/brandt_10SPE_01a_0916.pdf (slide18) [1] proposed the addition of an optional Fast Startup:
 - Cited .bp/.bw as evidence of feasibility where 100ms time limit for Startup is used
 - Cited robot-head tooling exchange as a use case
- Clause 146.4.4 specifies this Fast Startup for the T1L PHY and uses the same 100ms time limit as .bp/.bw
- I propose to remove this clause as the cited use case seems to be more suited to T1S and the time limit chosen is too short for the T1L PHY without compromising the CSD goals of broad market potential and economic feasibility
- The time limit chosen is exactly the same as for 100BaseT1 (802.3bw), re-using this limit means that the PHY has **10x fewer symbols** on which to train its receiver. At the same time it is expected to accommodate *much* longer channels (1000m vs. 15m)
- Given these significantly more challenging constraints I believe it is not possible to satisfy Clause 146.4.4 without significantly increasing the relative cost of the PHY

More details:

- In .bw the 'predetermined configuration' is interpreted to mean that the link parameters have been resolved and in 100ms there are a sufficient number of symbols to actually train a receiver for a reach of just 15m
- For the T1L PHY covering 1000m reach there are not a sufficient number of symbols to train a receiver and so the 'predetermined configuration' is interpreted to mean not just that the autoneg parameters have been resolved but that there is a full set of receiver coefficients available[2]
- It is the 'availability' of these receiver coefficients that is problematic as it implies either:
 - Non-Volatile Memory to store the coefficients with the associated increase in relative cost
 - A management entity which is continuously taking snapshots of the receiver coefficients so that an up-to-date copy will be available should a Fast Startup be required. Given that there could be up to 200 coefficients in a PHY it is questionable if these could be written to the PHY in 100ms. This is true particularly if there was a single management entity managing multiple PHYs all requiring different coefficients

Conclusion

- Various aspects of the preceding problems associated with the coefficient availability are already subject to 3 comments against the current Draft 2.0 (477,478,583)
- I propose the same remedy suggested in Comment 583 of simply removing the reference to 'Fast Startup' in Clause 146.4.4 this would also remedy comments 477,478
- Use cases requiring a fast startup in 100ms are already limited to short cables by the language in the current Draft[3] and these can be catered for by a T1S PHY.

Thank You

[1]:

Fast startup

- ❑ Define optional startup procedure which enables the time from `power_on=FALSE` to valid data to be less than 100ms
 - SUGGEST WE ACCEPT: FEASIBILITY IS REFERENCE 802.3BP/BW
- Define optional startup procedure which enables the time from `power_on=FALSE` to valid data to be less than TBD
- Require fast link recovery of 50ms in [5] in case of fault conditions
- Fast startup exists in at least one fieldbus (DeviceNet) of 500ms for robot head tooling exchange

References

[2],[3]: Clause 146.4.4 of Draft 2.0

There shall be two startup sequences, depending on which training time is needed during the startup. If there is no predetermined configuration available, the maximum time, until link_status = OK is reached, shall be less than 3000 ± 30 ms. If there is a predetermined configuration available (a set of valid filter coefficients is available), the maximum time from power_on = FALSE to link_status = OK shall be less than 100 ms.

NOTE - Fast startup is expected to be limited to very short link segment length only, where a predetermined configuration is available and where the change in ambient conditions has no significant influence on the available predetermined configuration or filter coefficient set.

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