

Broadcom Corporation

10/100/1000
Link Timing

January 2002



Link Up Time

Max Time to Establish Link thru AutoNegotiation following Power-Up

	<u>Auto-MDIX</u>	<u>Legacy</u>	
Break_link_timer	1500	1500	ms
mdix_time	700	0	ms
ability_match	72	72	ms
ack_match	72	72	ms
complete_ack	192	192	ms
flp_link_good_check	1000	1000	ms
Total	3.536	2.836	seconds

Link Up Time

Max Time to Establish Link thru AutoNegotiation following Power-Up

- *Actual total time from application of power to link up must additionally include power-up and any software/firmware process time, which is entirely vendor specific*
- *In practice, some PHYs or PHY combinations may occasionally cycle through the AutoNegotiation process several times before linking*

10BASE-T Link Down and Up Time

Max Time to Re-Establish Link thru AutoNegotiation following forced Link Drop

10BASE-T	<u>Auto-MDIX</u>	<u>Legacy</u>	
link_loss_timer_done	150	150	ms
Break_link_timer	1500	1500	ms
mdix_time	700	0	ms
ability_match	72	72	ms
ack_match	72	72	ms
complete_ack	192	192	ms
flp_link_good_check	1000	1000	ms
Total	3.686	2.986	seconds



100BASE-TX Link Down and Up Time

Max Time to Re-Establish Link thru AutoNegotiation following forced Link Drop

100BASE-TX	<u>Auto-MDIX</u>	<u>Legacy</u>	
PMD Link Loss	<1	<1	us
Break_link_timer	1500	1500	ms
mdix_time	700	0	ms
ability_match	72	72	ms
ack_match	72	72	ms
complete_ack	192	192	ms
flp_link_good_check	1000	1000	ms
Total	3.536	2.836	seconds



1000BASE-T Link Down and Up Time

Max Time to Re-Establish Link thru AutoNegotiation following forced Link Drop

	<u>Auto-MDIX</u>	<u>Legacy</u>	
Master link loss	760	760	ms
Break_link_timer	1500	1500	ms
mdix_time	700		ms
ability_match	288	288	ms
ack_match	288	288	ms
complete_ack	768	768	ms
flp_link_good_check	1000	1000	ms
Total	5.304	4.604	seconds



1000BASE-T Link Down and Up Time

Max Time to Re-Establish Link thru AutoNegotiation following forced Link Drop

	<u>Auto-MDIX</u>	<u>Legacy</u>	
Slave link loss	355	355	ms
Break_link_timer	1500	1500	ms
mdix_time	700	0	ms
ability_match	288	288	ms
ack_match	288	288	ms
complete_ack	768	768	ms
flip_link_good_check	1000	1000	ms
Total	4.899	4.199	seconds

Note: 1000BASE-T AutoNegotiation requires exchange of Base Page plus 3 additional Next Pages which are not required for 10/100



“Parallel Detection” Link Down and Up Time Max Time to Re-Establish Link without AutoNegotiation following forced Link Drop

	<u>Auto-MDIX</u>	<u>Legacy</u>	
Break_link_timer	1500	1500	ms
mdix_time	700	0	ms
ability_match	<1	<1	ms
link_status_check	1000	1000	ms
flp_link_good_check	1000	1000	ms
Total	3.2	2.5	ms

Summary: Maximum Times to Establish Link

	<u>Auto-MDIX</u>	<u>Legacy</u>	
AutoNeg from Power Up	3.5	3.5	sec
AutoNeg from Link Drop:			
10BASE-T	3.7	3.0	sec
100BASE-TX	3.5	2.8	sec
1000BASE-T Master	5.3	4.6	sec
1000BASE-T Slave	4.9	4.2	sec
Parallel Detection	3.2	2.5	sec

Comments

- ***Link-up time following power cycle depends on power-on time of PHY and time for system to reset, perform any operations before releasing PHY for link***
- ***Maximum specified link time for 10/100 is <4 seconds, although PHYs occasionally cycle thru AutoNeg more than once, taking a few more seconds***
- ***1000BASE-T requires 3 extra NEXT PAGE exchanges, which lengthens AutoNegotiation by ~ 1 second***
- ***PHYs are allowed to exchange additional NEXT PAGES, which can extend AutoNegotiation indefinitely***

